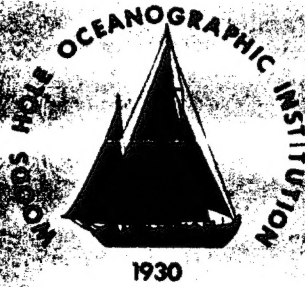


Woods Hole Oceanographic Institution



19950720 032

A COMPILATION OF MOORED CURRENT MEASUREMENT
DATA AND ASSOCIATED MOORING ACTION DATA
FROM MOORING 592 VOLUME XIV (1976 DATA)

by

S. Tarbell, R. Payne
and R. Walden

September 1977

TECHNICAL REPORT

*Prepared for the Applied Physics Laboratory of
the Johns Hopkins University under Contract
600651.*

WOODS HOLE, MASSACHUSETTS 02543

DTIC QUALITY INSPECTED 8

DISTRIBUTION STATEMENT A

Approved for public release;
Distribution Unlimited

36X

WHOI-77-41

A COMPILATION OF MOORED CURRENT METER
DATA AND ASSOCIATED MOORING ACTION DATA
FROM MOORING 592, VOLUME XIV (1976 DATA)

by

S. Tarbell, R. Payne
and R. Walden

WOODS HOLE OCEANOGRAPHIC INSTITUTION
Woods Hole, Massachusetts 02543

September 1977

TECHNICAL REPORT

Accession For	
NTIS CRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution /	
Availability Codes	
Dist	Avail and/or Special
A-1	

*Prepared for the Applied Physics Laboratory
of the Johns Hopkins University under Contract
600651.*

*Reproduction in whole or in part is permitted
for any purpose of the United States Government.
In citing this manuscript in a bibliography,
the reference should be followed by the phrase:
UNPUBLISHED MANUSCRIPT.*

Approved for Distribution

Valentine Worthington
Valentine Worthington, Chairman
Department of Physical Oceanography

DISTRIBUTION STATEMENT A
Approved for public release; Distribution Unlimited

ABSTRACT

Summaries of moored current meter data from one mooring set and retrieved in 1976 near St. Croix by the Woods Hole Oceanographic Institution are presented. The averaged current data are presented as statistics, spectral diagrams, plots of vector and scalar quantities versus time. Horizontal and vertical mooring motion data are also presented.

CONTENTS

	Page
ABSTRACT	i
CONTENTS	ii
PREFACE	iii
ACKNOWLEDGEMENTS	iv
Introduction, Section I, Mooring Motion	1
Description of Experiment	1
Description of Mooring	2
Description of Results	2
Introduction, Section II, Current Data	7
Vector Averaging Current Meter	7
Data Processing	8
Data Presentation	8
Statistics (STATS)	9
Progressive Vector Diagram (PROVEC)	12
Scatter Plots	14
Spectra and Cross Spectra	16
Variable vs. Time Plot	82
References	100
Appendix 1	101

PREFACE

This volume is the fourteenth of a series of Data Reports presenting moored current meter and associated data collected by the W.H.O.I. Buoy Group.

Volumes I through XIII present data from the years 1963-1970, and three array experiments: the 1970 Pollard array, the 1973 IWEX array and the 1973 MODE array.

Volume fourteen discusses measurements of the motion of a particular mooring and presents the current meter data from that mooring.

Volume Number	* W.H.O.I. * * Ref. # *	Authors	* * * years	Notes experiment
1	65-44	Webster, F., and N.P. Fofonoff		
2	66-60	Webster, F., and N.P. Fofonoff		
3	67-66	Webster, F., and N.P. Fofonoff		
4	70-40	Pollard, R.T.		
5	71-50	Tarbell, S., and F. Webster	1966	measurements
6	74-4	Tarbell, S.	1967	measurements
7	74-52	Chausse, D., and S. Tarbell	1968	measurements
8	75-7	Pollard, R.T., and S. Tarbell	1970	Array data
9	75-68	Tarbell, S., M.G. Briscoe, and D. Chausse	1973	IWEX Array
10	76-40	Tarbell, S.	1969	data (early)
11	76-41	Tarbell, S.	1969	data (late)
12	76-101	Chausse, D., and S. Tarbell	1973	MODE Array
13	77-18	Tarbell, S., and A.W. Whitlatch	1970	measurements
14	77-41	Tarbell, S., R. Payne, and R. Walden ⁺	Mooring 592, 1976	Saint Croix
15	77-56	Tarbell, S., and A.W. Whitlatch ⁺	1971	measurements

⁺In press

ACKNOWLEDGMENTS

Planning, staging, executing and processing the data for this experiment involved numbers of people and organizations. The W.H.O.I. Mooring Engineering group consisting of R. G. Walden, C. W. Collins, Jr., P. R. Clay and P. O'Malley designed, prepared, set and retrieved the mooring. J. R. Poirier and C. W. Collins, Jr. prepared the current meters. R. A. La Rochelle prepared the acoustic release. Help in the preparation of the mooring from the W.H.O.I. operations group under the supervision of R. D. Simoneau is gratefully acknowledged. The W.H.O.I. data processing group (D. Chausse, M. Raymer, S. Tarbell and A. Whitlatch) under the supervision of R. E. Payne processed all current meter data and prepared displays for this report. Staff scientists including W. J. Schmitz, Jr., M. G. Briscoe, and N. P. Fofonoff provided guidance and support to the experiment.

Dr. Wenstrand of APL was most helpful in the experiment design and planning. Acoustic release deck command gear was loaned by NADC (D. Closser) and MAS, Christensted (R. Mosey) who also provided other helpful services. Special mention is made of Lt. J. Hollister, an observer from NAVOCEANO whose sharp eyes averted a near-disaster during deployment by spotting an unwelded link of chain in the backup recovery system as it was about to go over the side. The Atlantic Fleet Weapons Training Facility services, under the direction of R. Kirkpatrick, were excellent. Special thanks are due the captains and crews of the deployment vessel USNS LYNCH and the YFU/ASP recovery vessel.

Introduction, Section 1, Mooring Motion

A contract was entered into with The Johns Hopkins University, Applied Physics Laboratory, February 1976, to deploy and retrieve an instrumented intermediate mooring for the Principal Scientist, Dr. David Wenstrand, at the Atlantic Fleet Weapons Training Facility, Frederiksted, St. Croix, U. S. Virgin Islands. The mooring design, preparation, launch and recovery was under the supervision of Robert G. Walden (W.H.O.I.). The current meters and acoustic release were prepared at W.H.O.I. The current meter data were processed under the direction of Dr. Richard E. Payne (W.H.O.I.).

Description of Experiment

The objective of the experiment was to obtain time series of current speed and direction and temperature at five depths over a period of one month and for two months at a sixth depth. The required mooring location was in the vicinity of hydrophone 3 at the St. Croix Atlantic Fleet Weapons Training Facility in approximately 1000 meters water depth. The Training Facility includes an acoustic tracking range which will be referred to in this report as "the range" or "the tracking range". Five vector averaging current meters (VACMs) were employed with a sampling rate of once per 56.2 seconds to provide adequate information on diurnal, semi-diurnal and inertial tidal motions as well as other effects. Originally specified current meter depths were 70, 120, 170, 220 and 270 meters from the surface. The spacing between instruments was required to be accurate to ± 5 meters. The static depth of the top current meter was specified to be within ± 15 meters of 70 meters. The depth of the top current meter was subsequently re-specified to be "no deeper than 100 meters". The sixth current meter was added to the mooring to obtain near-bottom currents for the Naval Facility Engineering Command. The sampling rate of this VACM was half the others (once per 112.5 seconds) allowing its record to be twice as long (two months) as the others. An acoustic pinger was attached near the top of the mooring to obtain tracking data for the determination of mooring motion for 72 hours after launch.

The deployment vessel (USNS LYNCH) was equipped with a hull-mounted acoustic pinger which was tracked by tracking range personnel who provided appropriate track and speed information to the vessel by radio according to a prearranged plan. This tracking service was used for both the preliminary bathymetric survey and the actual mooring deployment. The acoustic

tracking provided by the range was accurate to a meter or so. This accurate position data was imperative to prevent the anchor from damaging the many cables and hydrophones on the bottom. The operation plan is enclosed as Appendix 1. Coordinates given refer to range coordinates in meters from a datum point.

Description of the Mooring

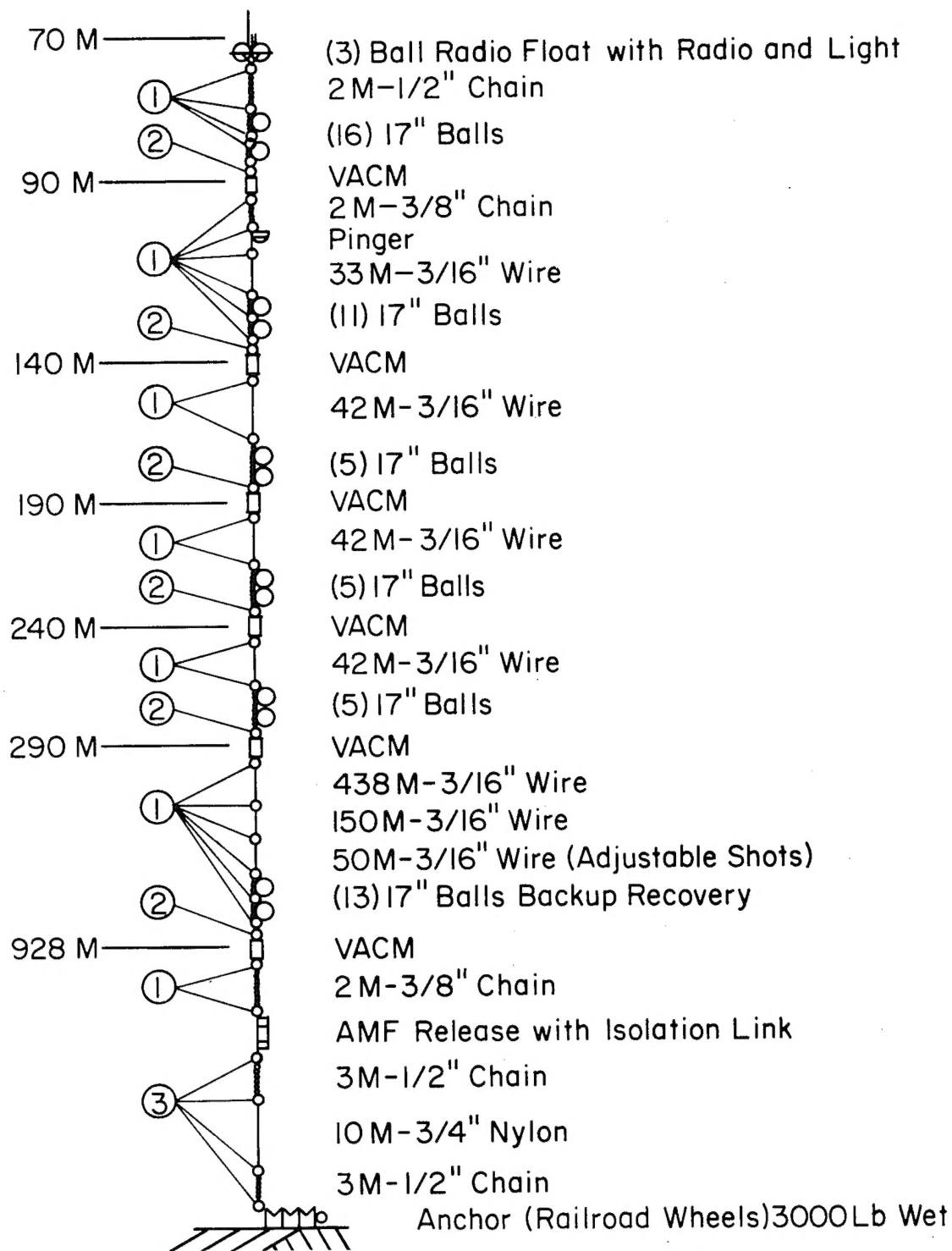
The mooring was patterned after a standard W.H.O.I. intermediate mooring. Figure 1 shows a schematic representation of the mooring. Starting at the top of the mooring the following components were installed. A radio/light float using three seventeen inch glass spheres was used as an aid in mooring recovery. Flotation throughout the mooring consisted of 17" glass spheres in hardhats attached to chain. Chain was also used to connect instruments together when the separation was small. The pinger was supplied by the range and was mounted in a special stainless steel bracket for insertion into the mooring. It was designed to operate continuously on a frequency of 75 kHz for 72 hours. VACMs were inserted at 90, 140, 190, 240, 290 and 928 meters depth beneath the radio float. 3/16" U. S. Steel 3 x 19 torque-balanced wire rope was used throughout the mooring. Thirteen glass spheres were attached above the anchor release to permit a back-up recovery capability in the event that any portion of the mooring parted. An AMF acoustic anchor release Model 322 with a transponder and a disabling feature was employed. A ten meter section of 3/4" nylon line was inserted between the release and the anchor to absorb transients during anchor launch. Five railroad wheels were chained together to provide 3000 pounds (weight in water) for the anchor.

The mooring was designed using the NOYFB computer program (Moller, 1976). Our best estimate of expected currents obtained from various sources were used as program inputs.

Description of Results

The mooring was launched February 20, 1976 and was retrieved April 27, 1976. The anchor location, 17° 43.8'N, 64° 56.53'W, was within 100 meters of the proposed position in water 972 meters deep. The depth of the radio float after settling out was determined to be 71.4 meters by steaming over it and observing its depth on the precision fathometer. The tracking range determination of the pinger depth was 98 meters giving a radio float depth of 74.2 meters, in good agreement with the fathometer-determined depth. The depth of the top VACM at this time was 96 meters.

D≈972 M



Sta. #592

Termination Code

- ① (2) 1/2" Shackles and (1) 1/2" Master Link
- ② (3) 1/2" Shackles and (2) 1/2" Master Links
- ③ 5/8" Shackles

Figure 1. St. Croix mooring

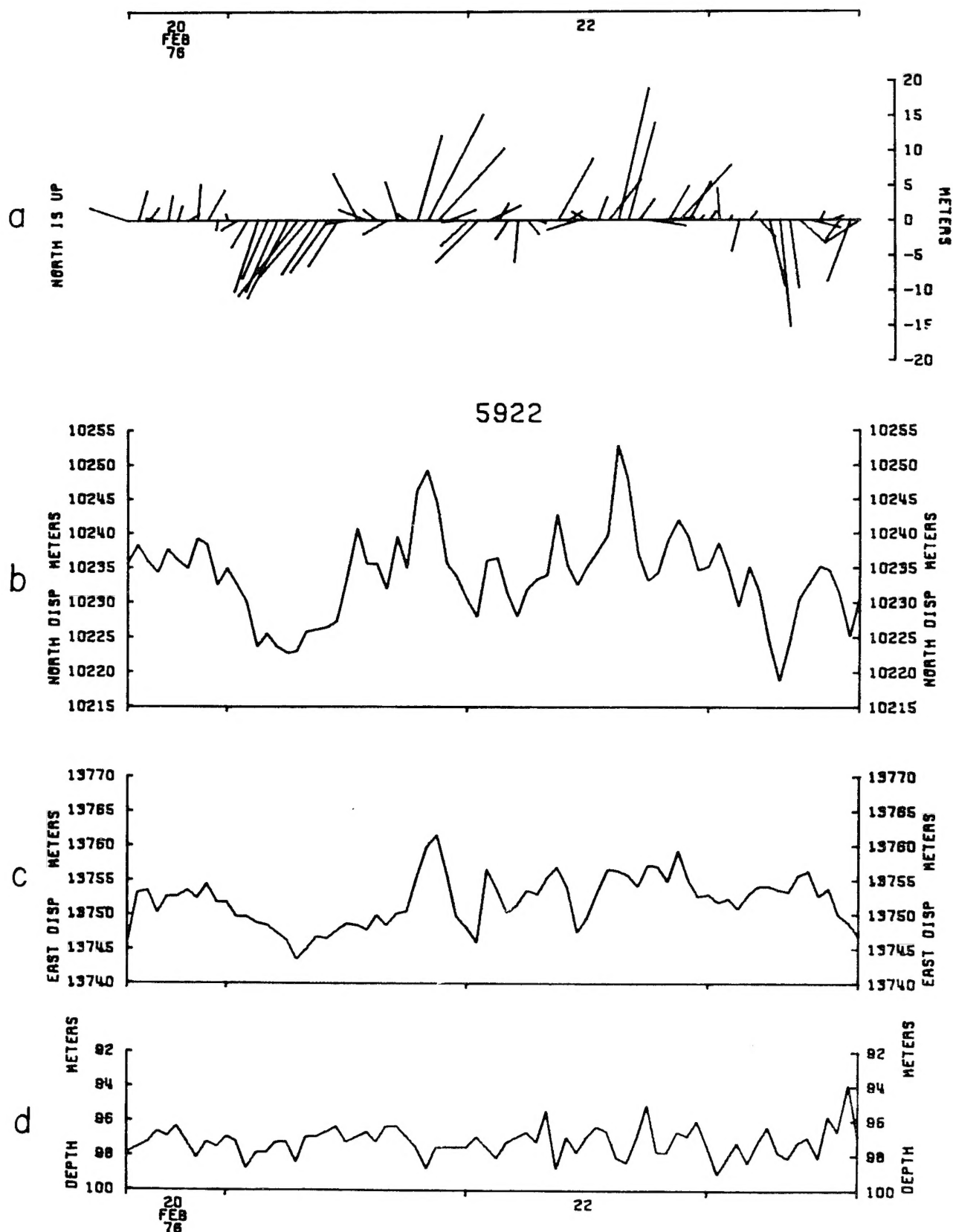
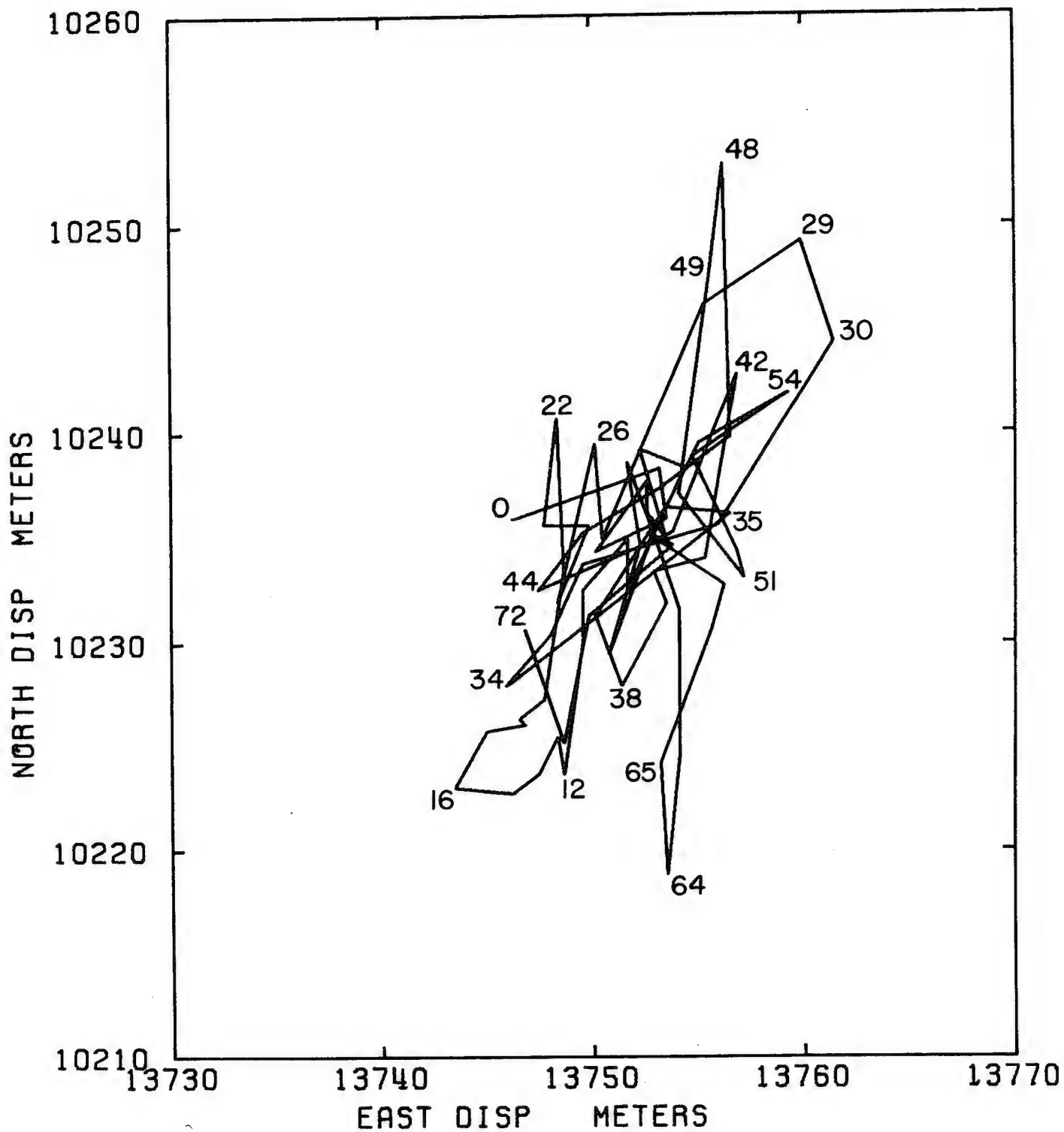


Figure 2. a) A stick plot displacements of pinger from mean position
 b) North displacement from range
 c) East displacement from range
 d) Depth variation



5922A1H

98 M

Figure 3 . A plot of the horizontal movement of the pinger

The range tracked the pinger on the mooring for 72 hours. Figure 2a is a stick plot of the displacement of the pinger from the mean position. The length of each "stick" is proportionate to the displacement of the pinger from its mean position. Its direction indicates the displacement direction. X and Y coordinates for this same time period are also shown in Figure 2b and 2c. Figure 2d shows pinger depth variations over this time span. Figure 3 is a plan view plot of the horizontal movement of the pinger for the first 72 hours. The plotted pinger data is from 1-hour subsampled data series. The numbers on the plot represent hours after launch.

The DSRV ALVIN inspected and photographed the mooring a few days after launch. They reported that the rotor of the bottom current meter was "cocked" in its housing. Upon retrieval the instrument was inspected and found to have a broken rotor pivot bearing. This damage appears to have occurred at launch.

Introduction, Section 2, Current Data

Unlike the preceding volumes this report presents data from a single mooring (Number 592) set by the Buoy Group in February 1976. The purpose and result of the experiment have been discussed in Section 1. This section presents the current meter data from that mooring. There were seven instruments on the mooring line: 6 VACMs and one pinger. The following table lists the instruments and related information.

Table 1

Data Name	Instrument Type	Recording Interval (sec)	Depth (m)	Data Length (Days)	Comments
5921	VACM	56.25	95	32	Good data
5922	Pinger	-	97	3	Tracked by the range
5923	VACM	56.25	144	32	Good data
5924	VACM	56.25	193	32	Good data
5925	VACM	56.25	243	32	Good data
5926	VACM	56.25	292	0	No data on tape
5927	VACM	112.50	950	64	No rotor information Pivot broken at launch

Water depth 972 m

Vector Averaging Current Meter

The Vector Averaging Current Meter (VACM) gathers compass and vane information and computes E and N components each time a pair of rotor magnets pass the sensing diode. These components are summed through the entire recording interval. There are 16 magnets on the rotor so one complete revolution causes eight compute and accumulate cycles. Temperatures are measured by a thermistor whose resistance is converted to frequency and summed over the recording interval. The VACM uses a quartz crystal which oscillates at a frequency of 74.5654 Khz to provide clocking pulses to the instrument. The accuracy of the crystal clock is ± 1 second per day. Time is indicated by placing a clock count value in each data cycle.

Data Processing

The VACM data, recorded on 4 track 1/4" magnetic tape cassettes, were first transcribed onto a computer compatible magnetic tape, then converted to the Maltais format (Maltais, 1969). Data from the top four VACMs were very clean and needed no editing. Data from the lowest VACM had no rotor information. Its only recoverable data were the last compass and vane values from each recording interval and temperature. All five records have had gaps in the time series filled with interpolated values. The maximum number of interpolated points occurred in record 5923 in which 30 data cycles were interpolated in a series 47,824 data cycles long.

Data Presentation

All the data from the four good VACMs plus the partial information from the bottom VACM are displayed in this section following the descriptions for each type of plot. Presentations are as follows:

1. Statistical information
2. Progressive vector diagrams
3. u vs. v scatter plots
4. Spectral diagrams and computer print out
5. Variable vs. time plots. Variables plotted are u, v (north and east current components), direction, speed (both derived from u, v), temperature, instantaneous compass and vane, and bearing (compass + vane)
6. Selected segments of variable vs. time plots with expanded time scales.

Statistics (STATS)

Standard statistical parameters are calculated for data in the time-range given at the bottom of the table. If there are n speed and direction values in a sample, and we define $E_i = S_i \sin \theta_i$, $N_i = S_i \cos \theta_i$, then for $A = E, N$, and S ,

$$\text{mean, } \bar{A} = \frac{1}{n} \sum_{i=1}^n A_i$$

$$\text{variance, } \sigma_A^2 = \frac{1}{n} \sum_{i=1}^n A_i^2 - \bar{A}^2$$

$$\text{standard error of the mean} = \frac{\sigma_A}{\sqrt{n}}$$

$$\text{standard deviation} = \sigma_A$$

$$\text{skewness} = \frac{1}{\sigma_A^3} \left[\frac{1}{n} \sum_{i=1}^n A_i^3 - \frac{3\bar{A}}{n} \sum_{i=1}^n A_i^2 + 2\bar{A}^3 \right]$$

$$\text{kurtosis} = \frac{1}{\sigma_A^4} \left[\frac{1}{n} \sum_{i=1}^n A_i^4 - \frac{4\bar{A}}{n} \sum_{i=1}^n A_i^3 + \frac{6\bar{A}^2}{n} \sum_{i=1}^n A_i^2 - 3\bar{A}^4 \right]$$

The program also calculates "East and North" statistics,

$$\text{covariance, } M = \frac{1}{n} \sum_{i=1}^n E_i N_i - \bar{E} \bar{N}$$

$$\text{standard deviation of covariance, } \sigma_m = \frac{1}{n} \sum_{i=1}^n (E_i N_i)^2 - \overline{E_i N_i}^2$$

$$\text{standard error of covariance} = \frac{\sigma_m}{\sqrt{n}}$$

$$\text{correlation coefficient, } M' = \frac{M}{\sigma_E \sigma_N}.$$

The program also calculates parameters related to vector quantities:
the scalar amplitude of the vector mean, $V_m = \sqrt{\bar{E}^2 + \bar{N}^2}$; vector variance,
 $V_v^2 = \frac{1}{2} (\sigma_E^2 + \sigma_N^2)$; standard deviation = V_v .

DATA/ 5921B56.25

```
*****
VARIABLE * EAST * NORTH * SPEED * TEMPERATURE *
UNITS * MM/S * MM/S * MM/S * DEGREES C. *
*****
MEAN * 35.971 * -6.751 * 117.587 * 24.744 *
STD. ERR. * .380 * .438 * .272 * .589E-3 *
VARIANCE * 689.0323 * 9125.411 * 3528.547 * .165E-1 *
STD. DEV. * 83.008 * 95.527 * 59.402 * .129 *
KURTOSIS * 3.343 * 2.781 * 4.783 * 4.364 *
SKEWNESS * .376 * .246 * 1.070 * .706 *
MINIMUM * .290.665 * -342.791 * 19.957 * 24.003 *
MAXIMUM * 298.848 * 323.518 * 432.941 * 25.351 *
*****
```

```
*****
EAST & NORTH
*****
COVARIANCE * 3965.846 *
STD. ERR. OF COVARIANCE * 45.650 *
STD. DEV. OF COVARIANCE * 9961.274 *
CORRELATION COEFFICIENT * .500 *
VECTOR MEAN * 36.599 *
VECTOR VARIANCE * 8007.867 *
VECTOR STD. DEV. * 89.487 *
*****
SAMPLE SIZE = 47616 POINTS
*****
SPANNING RANGE
FROM 76- 11-20 19.00.28
TO 76- 11-22 18.59.31
DURATION 31.00 DAYS
*****
```

DATA/ 5924B56.25

```
*****
VARIABLE * EAST * NORTH * SPEED * TEMPERATURE *
UNITS * MM/S * MM/S * MM/S * DEGREES C. *
*****
MEAN * 39.889 * 15.491 * 92.946 * 20.799 *
STD. ERR. * .269 * .342 * .215 * .235E-2 *
VARIANCE * 3450.259 * 5572.033 * 2210.763 * .263 *
STD. DEV. * 58.739 * 74.646 * 47.018 * .513 *
KURTOSIS * 3.053 * 2.973 * 3.712 * 2.784 *
SKEWNESS * .110 * .112 * .918 * .941E-1 *
MINIMUM * -144.184 * -248.006 * 6.845 * 19.234 *
MAXIMUM * 253.633 * 291.878 * 306.405 * 22.531 *
*****
```

```
*****
EAST & NORTH
*****
COVARIANCE * 695.655 *
STD. ERR. OF COVARIANCE * 25.289 *
STD. DEV. OF COVARIANCE * 5518.411 *
CORRELATION COEFFICIENT * .159 *
VECTOR MEAN * 42.791 *
VECTOR VARIANCE * 4511.146 *
VECTOR STD. DEV. * 67.165 *
*****
SAMPLE SIZE = 47617 POINTS
*****
SPANNING RANGE
FROM 76- 11-20 19.00.28
TO 76- 11-22 19.00.28
DURATION 31.00 DAYS
*****
```

DATA/ 5923B56.25

```
*****
VARIABLE * EAST * NORTH * SPEED * TEMPERATURE *
UNITS * MM/S * MM/S * MM/S * DEGREES C. *
*****
MEAN * 43.260 * -1.859 * 110.846 * 23.205 *
STD. ERR. * .338 * .306 * .268 * .197E-2 *
VARIANCE * 5450.548 * 7848.757 * 2931.651 * .186 *
STD. DEV. * 73.828 * 88.593 * 54.145 * .431 *
KURTOSIS * 2.661 * 2.564 * 3.027 * 3.163 *
SKEWNESS * .234E-1 * .590 * .590 * .229 *
MINIMUM * -181.240 * -274.375 * 20.802 * 21.804 *
MAXIMUM * 295.895 * 275.362 * 352.576 * 24.463 *
*****
```

```
*****
EAST & NORTH
*****
COVARIANCE * 2747.438 *
STD. ERR. OF COVARIANCE * 34.818 *
STD. DEV. OF COVARIANCE * 7597.773 *
CORRELATION COEFFICIENT * .420 *
VECTOR MEAN * 43.300 *
VECTOR VARIANCE * 6649.672 *
VECTOR STD. DEV. * 81.546 *
*****
SAMPLE SIZE = 47616 POINTS
*****
SPANNING RANGE
FROM 76- 11-20 19.00.28
TO 76- 11-22 18.59.31
DURATION 31.00 DAYS
*****
```

DATA/ 5925A56.25

```
*****
VARIABLE * EAST * NORTH * SPEED * TEMPERATURE *
UNITS * MM/S * MM/S * MM/S * DEGREES C. *
*****
MEAN * 33.079 * 20.724 * 91.831 * 18.577 *
STD. ERR. * .241 * .350 * .188 * .137E-2 *
VARIANCE * 2761.166 * 5845.093 * 1687.794 * .88E-1 *
STD. DEV. * 52.547 * 76.453 * 41.083 * .298 *
KURTOSIS * 2.808 * 2.188 * 3.045 * 3.088 *
SKEWNESS * -.269E-1 * .172E-2 * .643 * .70E-1 *
MINIMUM * -163.633 * -203.351 * 8.209 * 17.617 *
MAXIMUM * 197.336 * 223.441 * 242.527 * 19.918 *
*****
```

```
*****
EAST & NORTH
*****
COVARIANCE * 840.131 *
STD. ERR. OF COVARIANCE * 22.188 *
STD. DEV. OF COVARIANCE * 4841.617 *
CORRELATION COEFFICIENT * .209 *
VECTOR MEAN * 39.035 *
VECTOR VARIANCE * 4303.129 *
VECTOR STD. DEV. * 65.598 *
*****
SAMPLE SIZE = 47616 POINTS
*****
SPANNING RANGE
FROM 76- 11-20 19.00.28
TO 76- 11-22 18.59.31
DURATION 31.00 DAYS
*****
```

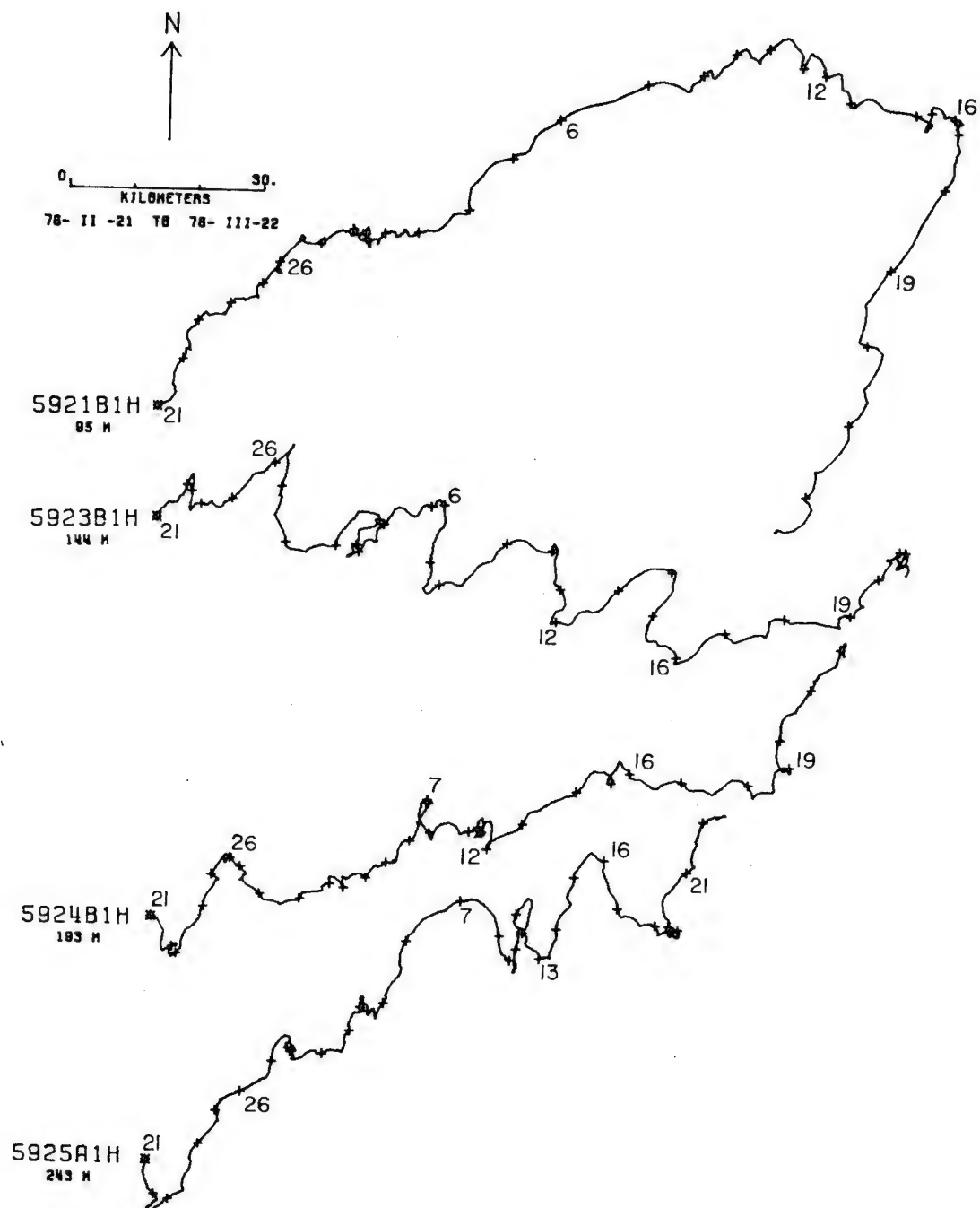
DATA/ 5927A112.5

```
*****
VARIABLE * TEMPERATURE
UNITS * DEGREES C.
*****
MEAN * 5.585
STD. ERR. * .450E-3
VARIANCE * .101E-1
STD. DEV. * .100
KURTOSIS * 3.152
SKEWNESS * .907E-1
MINIMUM * 5.209
MAXIMUM * 5.917
```

```
*****
* SAMPLE SIZE = 49569 POINTS
*
* SPANNING RANGE
* FROM 76- II -20 19.00.56
* TO 76- IV -25 08.00.56
*
* DURATION 64.54 DAYS
```

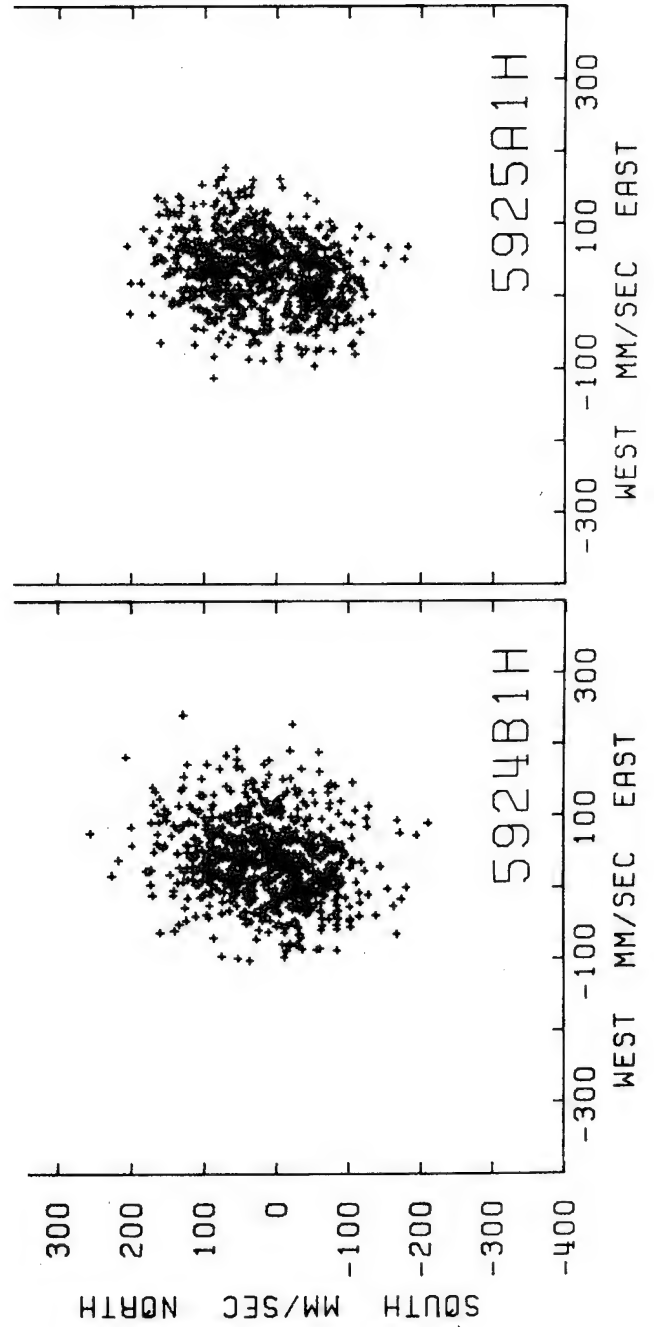
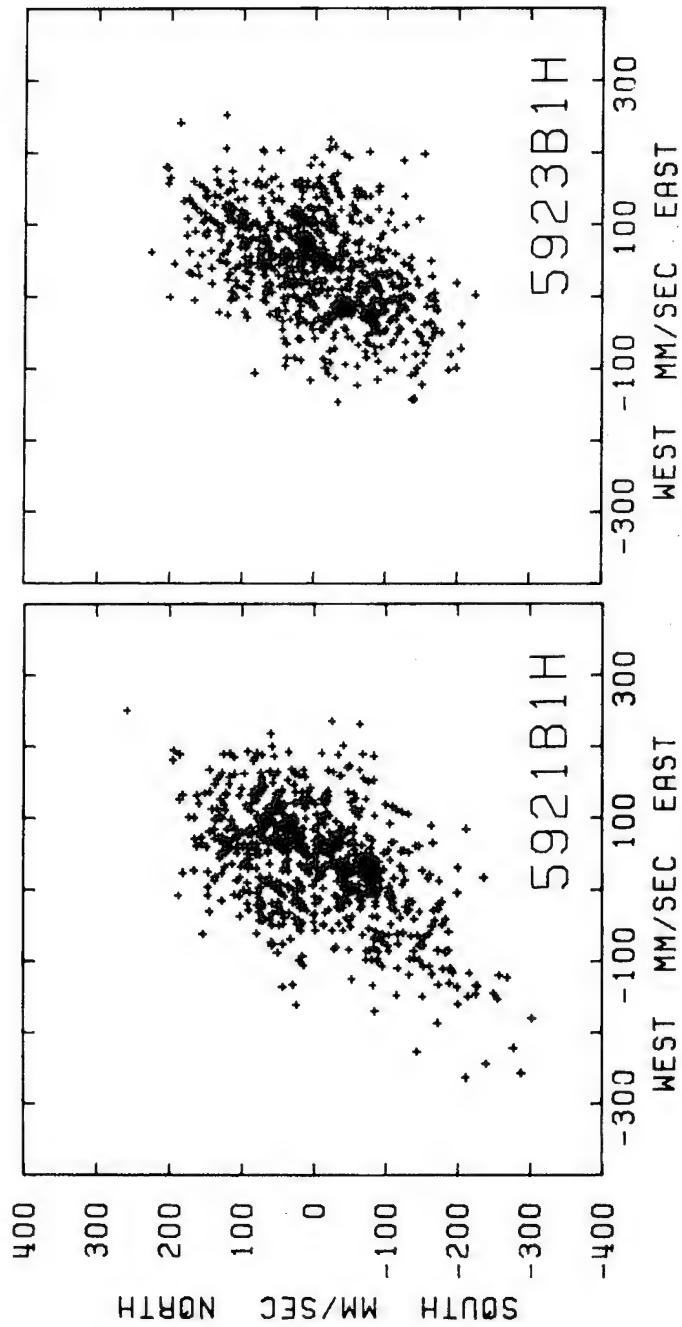
Progressive Vector Diagram (PROVEC)

The EAST and NORTH progressive displacements are computed from two hour vector averages. The plot begins with an asterisk (*) on 76-02-20 19.00.28. All following day boundaries are indicated with a plus (+). This type of plot accentuates very low frequency events at the expense of higher frequency oscillations which may be hidden by a large amplitude low-frequency current.



Scatter Plots

The 1 hour averaged u and v components are plotted against each other to display the vector coordinates. This type of plot shows general data trends and velocity extrema.



Spectra and Cross-Spectra

Program TIMSAN (TIME Series ANALysis) is used to calculate all spectral quantities; the Fast Fourier Transform routine of Singleton (1969) is the basic algorithm.

The autospectra shown are from records which have been broken into 9 segments of 5000 points each; additionally, the East, North, and Temperature autospectra are cosine windowed (Hanning) and 50% overlapped. Spectral estimates are obtained by ensemble-averaging across the segments.

Each autospectrum has a lowest-frequency estimate of $64/5000 = 0.0128$ cph, and a Nyquist frequency of 32 cph. The spectra are frequency-band averaged to further increase stability, at the expense of frequency resolution. The averaging algorithm is:

- first forty points - average 1 frequency
- next thirty points - average 2 frequencies
- next thirty points - average 5 frequencies
- next 400 points - average 10 frequencies
- next 300 points - average 20 frequencies
- next 300 points - average 50 frequencies
- next 4000 points - average 100 frequencies.

Since each spectrum contains only 2500 estimates before band averaging, the plotted results display only 136 points, the first 40 of which are based on one frequency band each, the last 14 of which are based on 100 frequency bands each.

The spectra are "one-sided", i.e., the area under the spectrum, for positive frequencies only, equals the variance of the original data. The variance loss due to the cosine window is accounted for by multiplying each spectral estimate by $8/3$.

Table 2 is a matrix of Page Numbers for each depth-variable pair; "CW" is the clockwise rotary spectrum, "CCW" the counter-clockwise rotary spectrum, "Total" the spectrum of horizontal kinetic energy, i.e., the sum of CW and CCW (c.f., Gonella, 1972).

Table 2
Page Numbers for
Auto-Spectra

	East	North	Temperature	CW	CCW	Total
95 m	21	29	37	49	51	47
144 m	23	31	39	55	57	53
193 m	25	33	41			
243 m	27	35	43			
950 m			45			

Confidence limits for the autospectra depend upon whether the data segments were windowed and overlapped or not, and on how much frequency-band averaging has occurred. Table 3 gives the 95% confidence limits; the number in parenthesis following the confidence limit is the number of equivalent degrees of freedom in the estimate.

Table 3
95% Confidence Limits for
Autospectra Estimates

Frequency Band (cph)	East, North Temperature (windowed, overlapped)	CW, CCW, Total
0.0128 - 0.512	0.66 - 1.71 (34.4)	0.57 - 2.19 (18)
0.5248 - 0.8960	0.69 - 1.58 (46.2)	0.66 - 1.69 (36)
0.9088 - 1.280	0.76 - 1.37 (91.7)	0.76 - 1.37 (90)
1.2928 - 6.400	0.82 - 1.25 (171.5)	0.82 - 1.24 (180)
6.4128 - 10.240	0.86 - 1.17 (332.3)	0.87 - 1.16 (360)
10.2528 - 14.080	0.91 - 1.10 (815.6)	0.91 - 1.10 (900)
14.0928 - 32.000	0.93 - 1.07 (1624.5)	0.94 - 1.07 (1800)

Cross-spectra are shown only for the upper pair of instruments (95 m and 144 m). Table 4 shows which variable pair is given on which page. The cross-spectra are plotted as coherence (modulus of the complex cross-spectrum) and phase (arctangent of the ratio of quadrature spectrum to co-spectrum). The same logarithmic frequency-band averaging scheme

as used for autospectra has been used on the cross-spectra prior to calculating coherence and phase. In addition, each cross-spectrum has been calculated twice: once with the same resolution and averaging as for the autospectra, and once with data segments of only 640 points which gives more segments to average over and hence increased statistical reliability, at the expense of low-frequency resolution.

Table 4
Page Numbers
for Cross-Spectra
(95 m vs 144 m)

East-East	59
North-North	61
Temperature-Temperature	63

The 95% confidence levels for the hypothesis of zero true coherence (i.e., the level below which 95% of the estimates would fall if the two records were truly incoherent) are given in Table 5.

Table 5
95% Confidence Levels
on Zero True Coherence Hypothesis

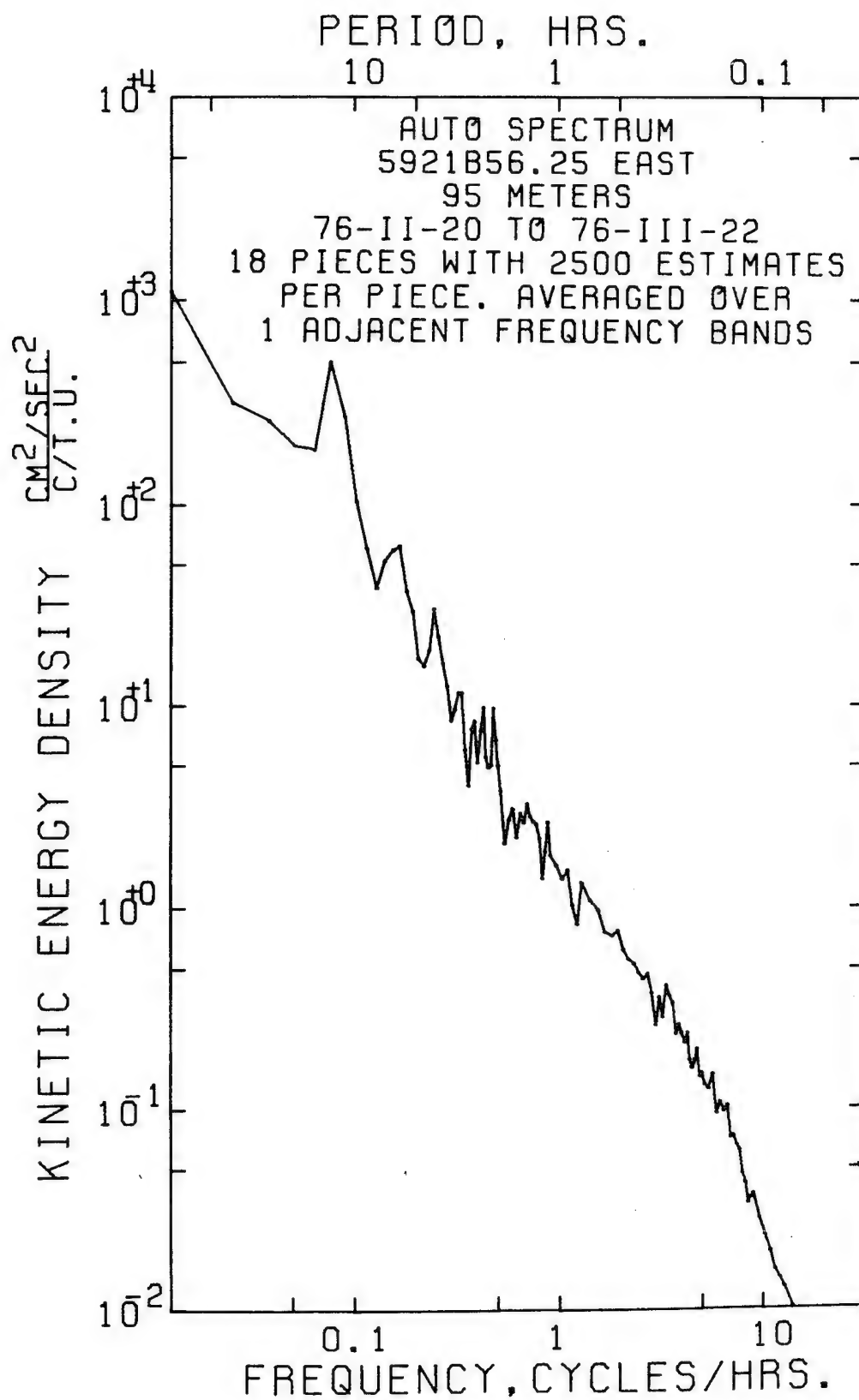
No. of Points in Data Segment	Frequency Band (cph)	95% Confidence Level
5000	0.0128 - 0.512	0.411
	0.5248 - 0.8960	0.356
	0.9088 - 1.280	0.254
	1.2928 - 6.400	0.186
	6.4128 - 10.240	0.134
	10.2528 - 14.080	0.086
	14.0928 - 32.00	0.061
640	0.10 - 4.00	0.146
	4.10 - 7.00	0.126
	7.10 - 10.00	0.089
	10.10 - 32.00	0.065

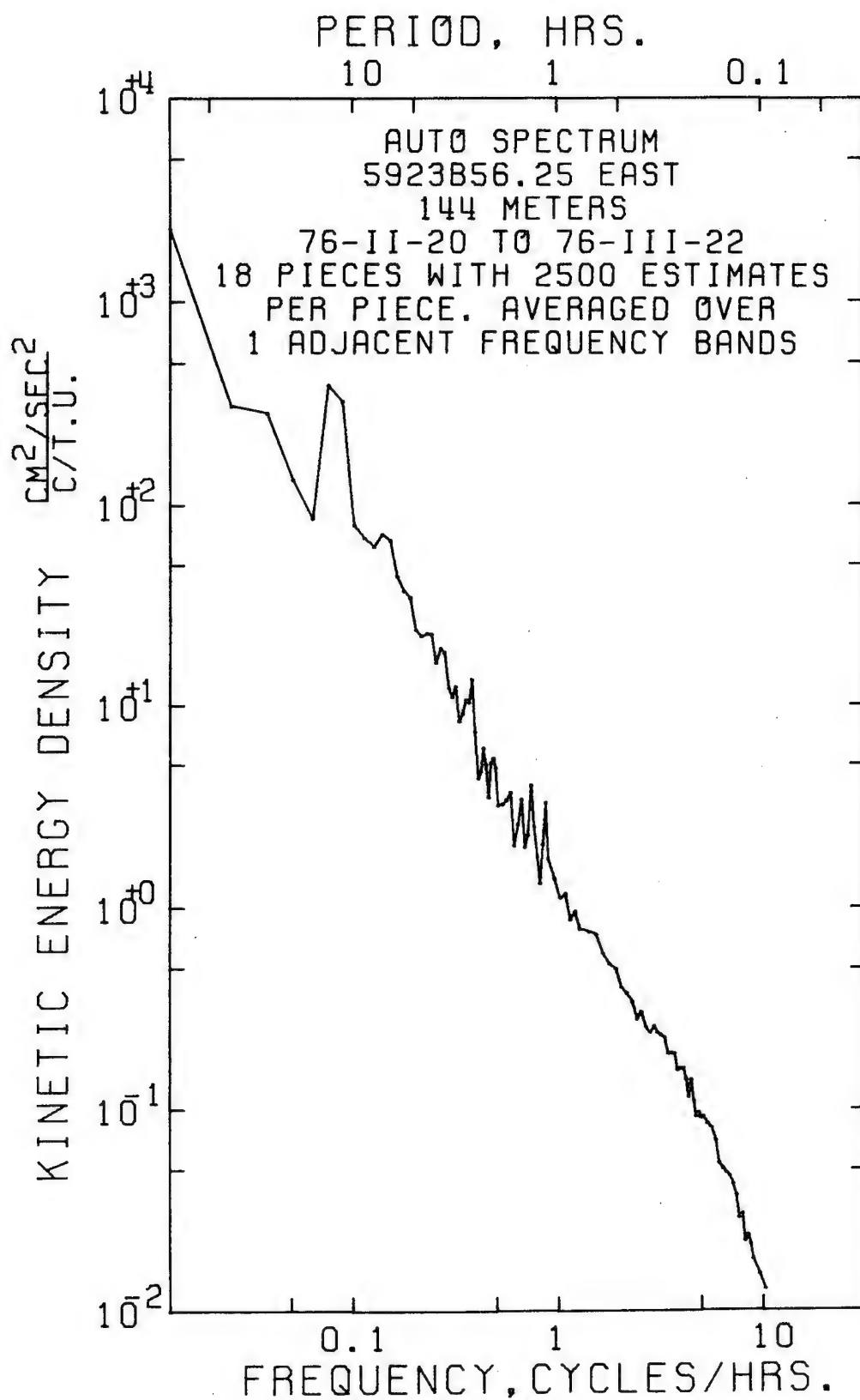
It would be inappropriate to accept as meaningful any phase estimate corresponding to a coherence estimate falling below the 95% confidence level. For those few acceptable phase estimates, 95% confidence limits may be estimated as

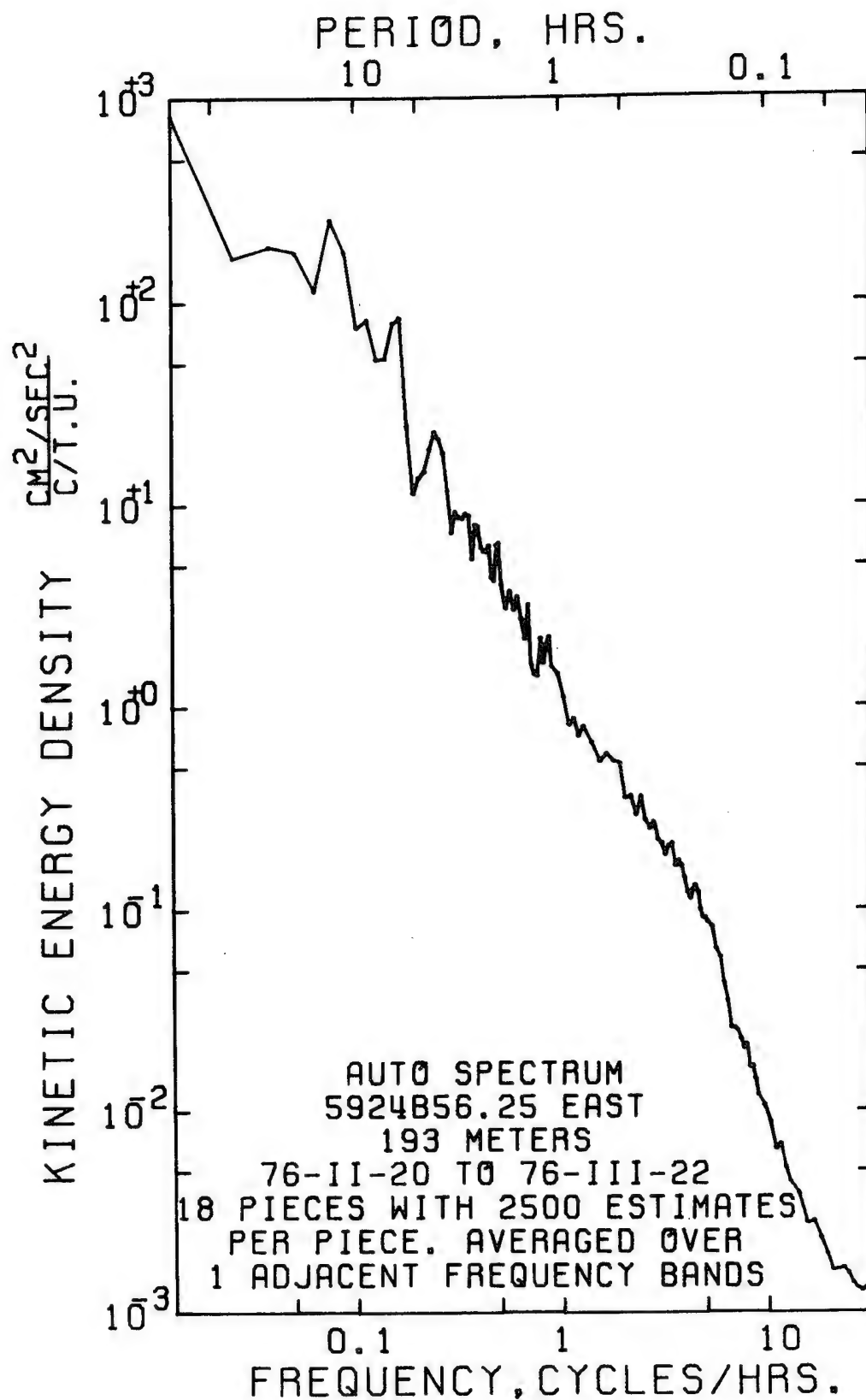
$$\pm\Delta\phi = \arcsin \left(t_{\nu} \left(\frac{1 - \gamma^2}{\nu \gamma^2} \right)^{\frac{1}{2}} \right)$$

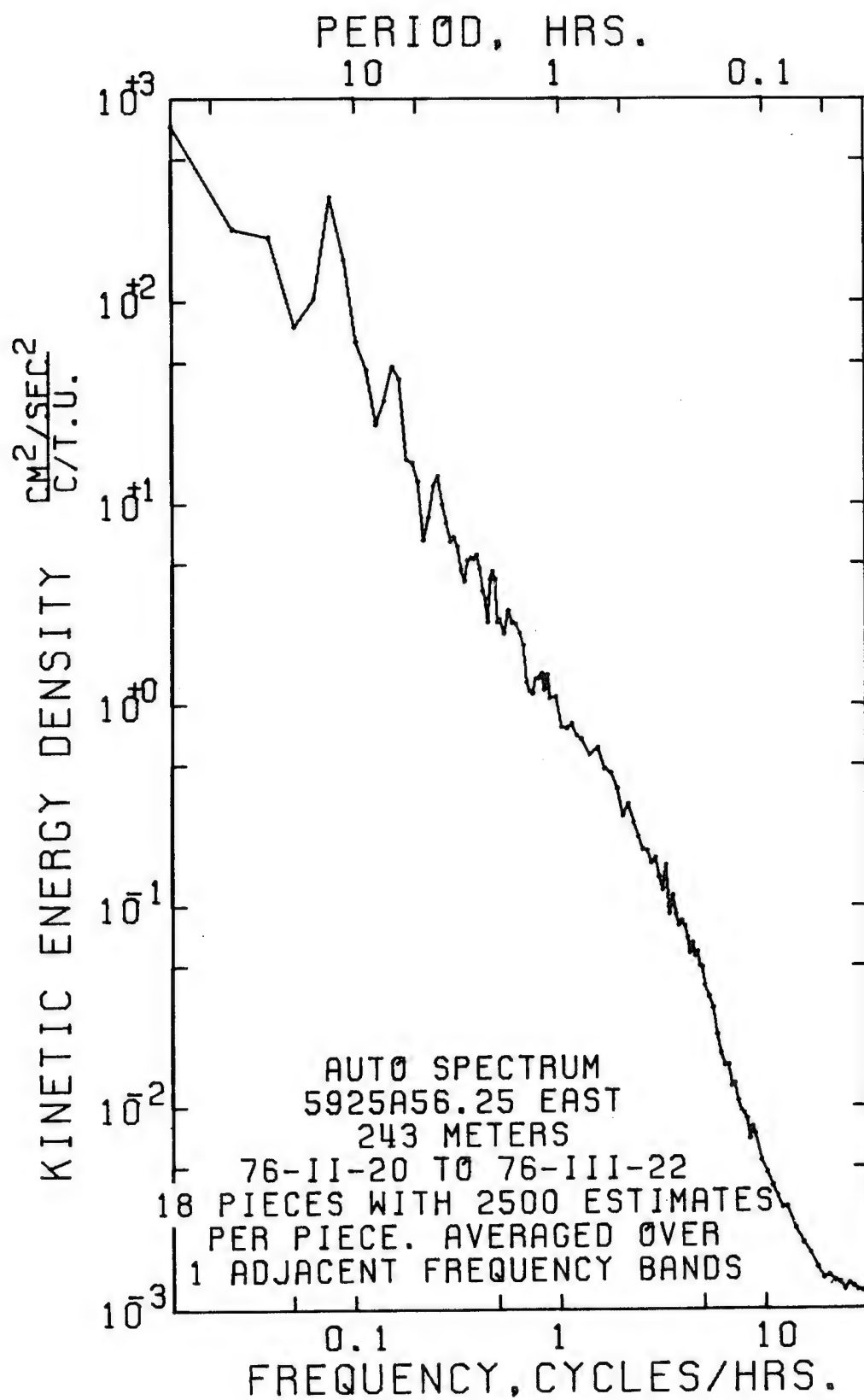
where $t_{\nu} = 1.96 + 2.38/\nu + 2.64/\nu^2 + 2.56/\nu^3$, γ is the acceptable coherence estimate, and ν is the equivalent number of degrees of freedom for the estimate. For the higher-resolution, lower-stability cross-spectra (upper part of each figure), the ν value is given in Table 3 for the windowed, overlapped case. For the lower-resolution, higher-stability cross-spectra, the ν value is 8.15 times larger, for each frequency band. Note that for $\nu > 23$, i.e., all the estimates given here, $t_{\nu} = 1.96$ to better than 5%. For example, in the lower part of the Temperature-Temperature coherence (page 63) at cph is 0.25, which implies it is acceptable non-zero. The phase confidence limits are thus 22° which means that the phase at 0.3 cph is statistically indistinguishable from zero.

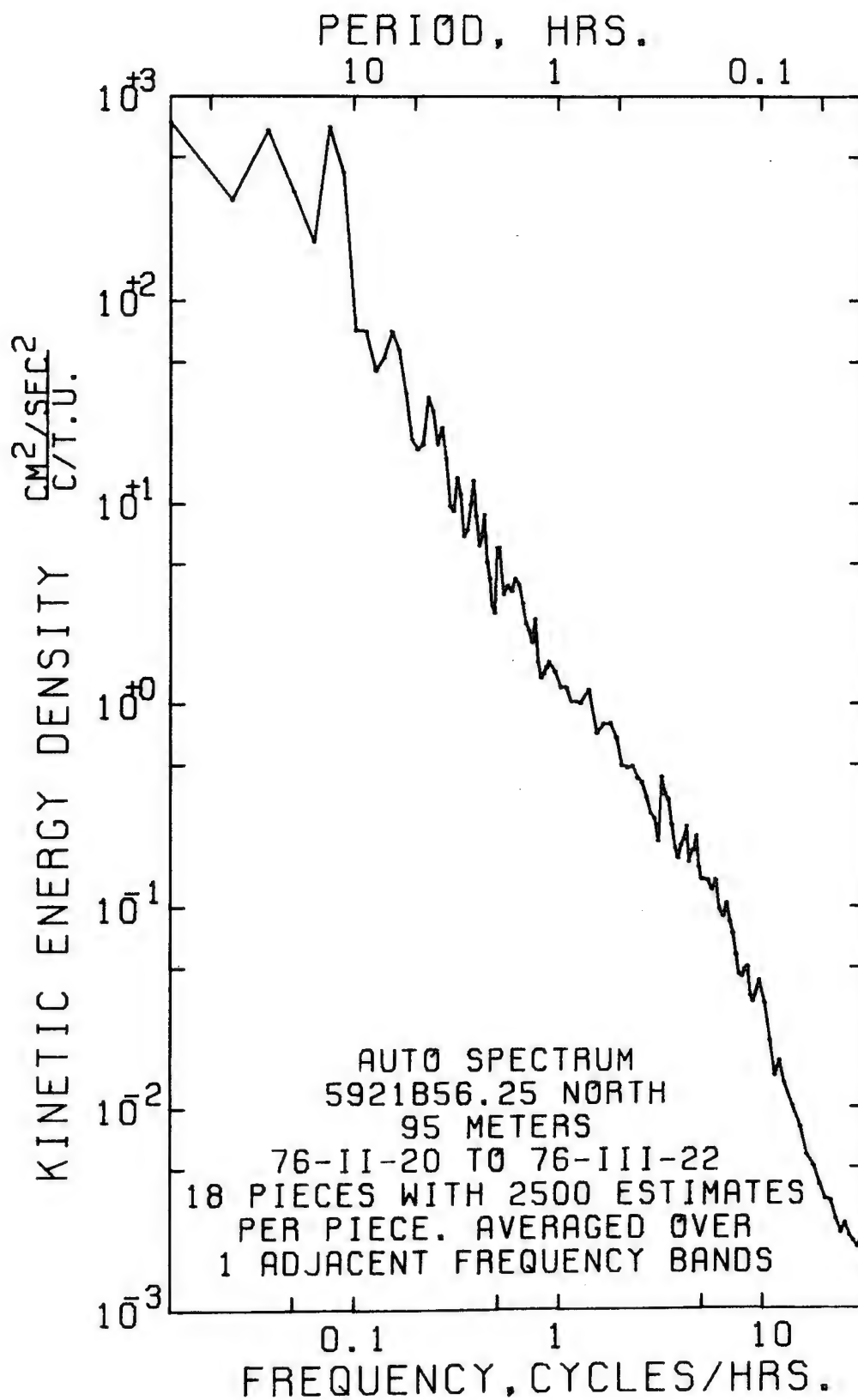
A set of cross-spectral quantities is provided, page 64, but they are not plotted. These are the rotary (i.e., vector) coherences between the 95 m and 144 m current measurements; only the results up to 4 cph are given. For completeness computer output is also included from the 95 m and 144 m (pages 70, 76 respectively) rotary autospectral results: of particular interest are the quantities such as rotary coefficient, ellipse orientation and stability, and mean ellipse orientation.

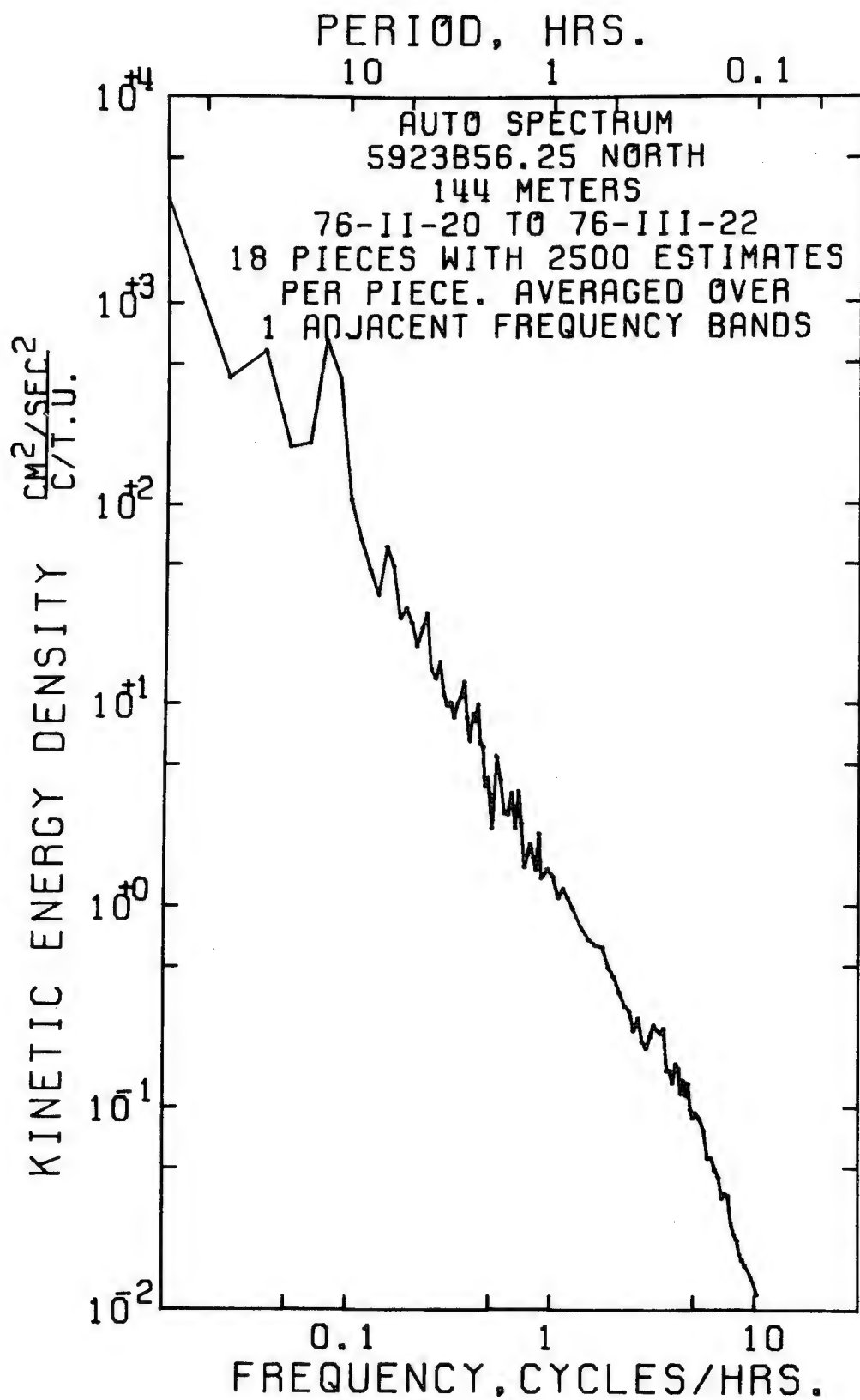


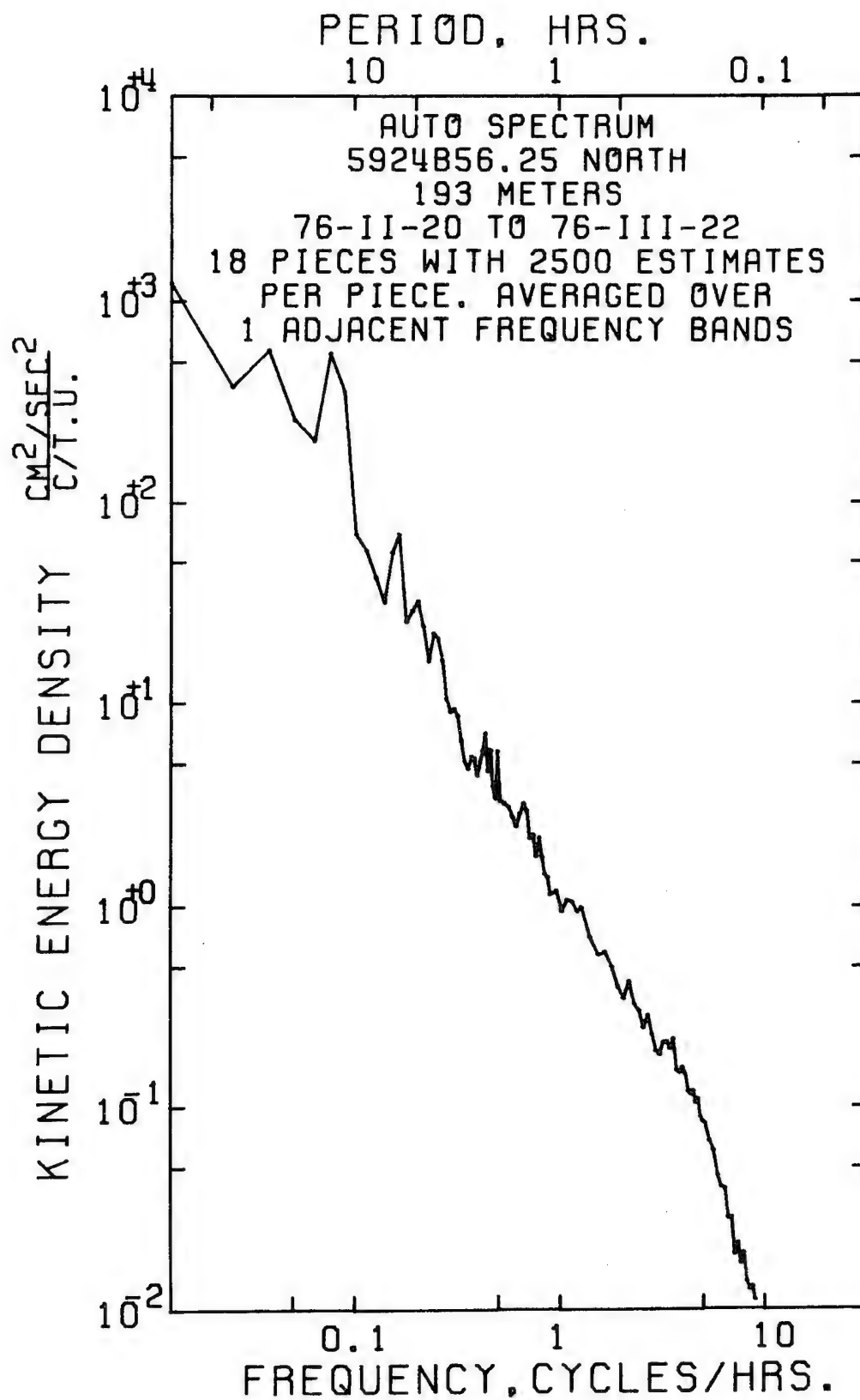


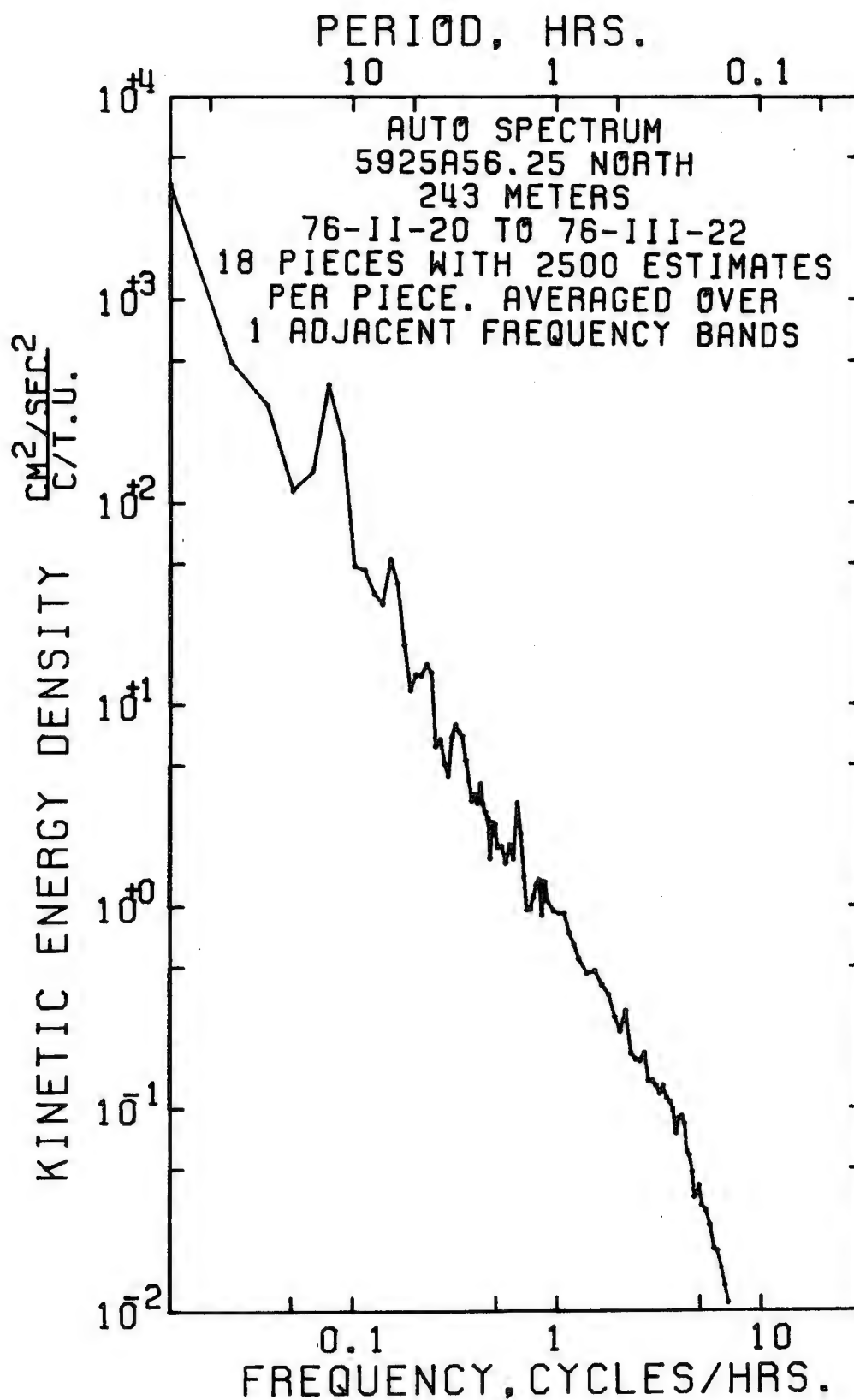


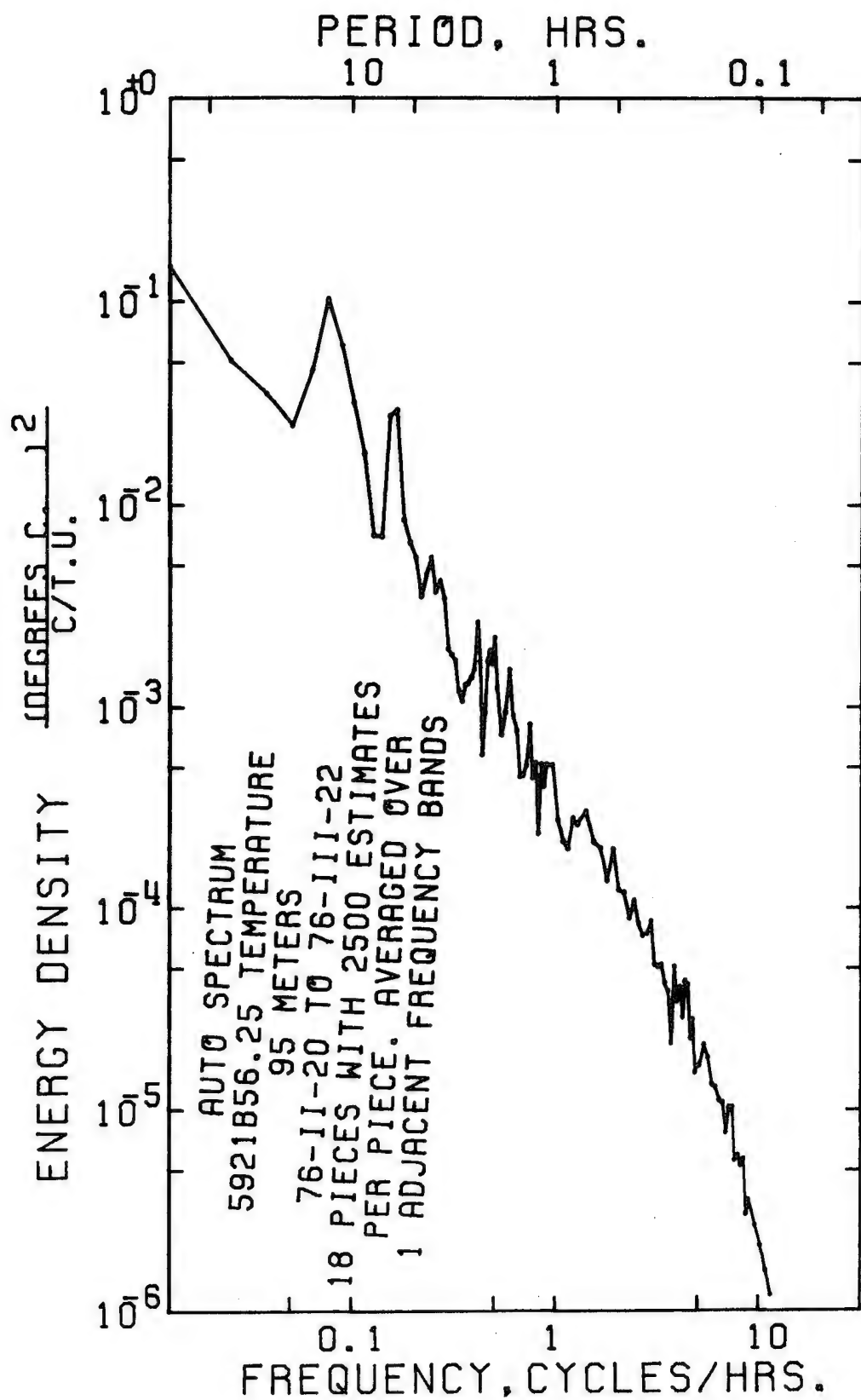


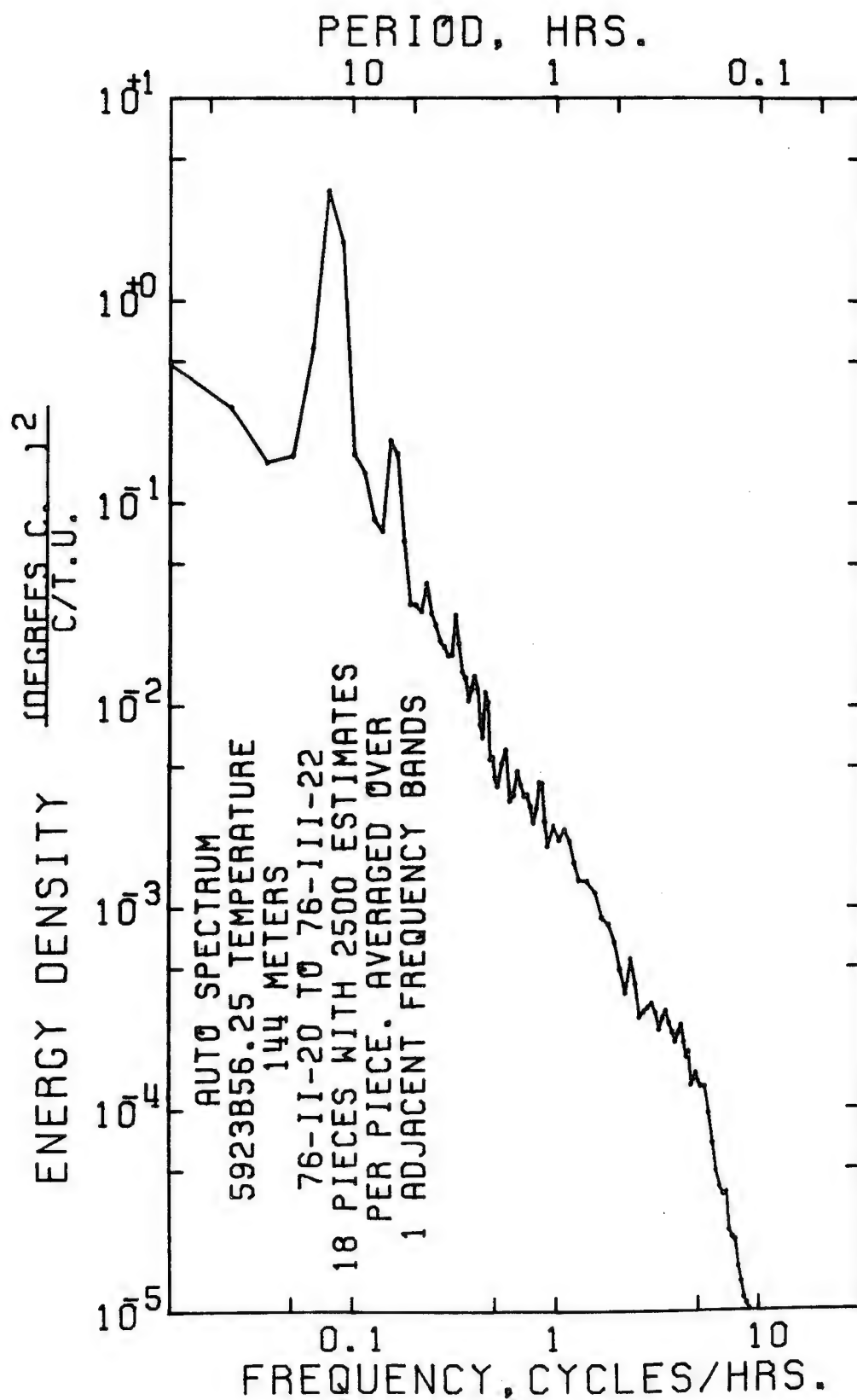


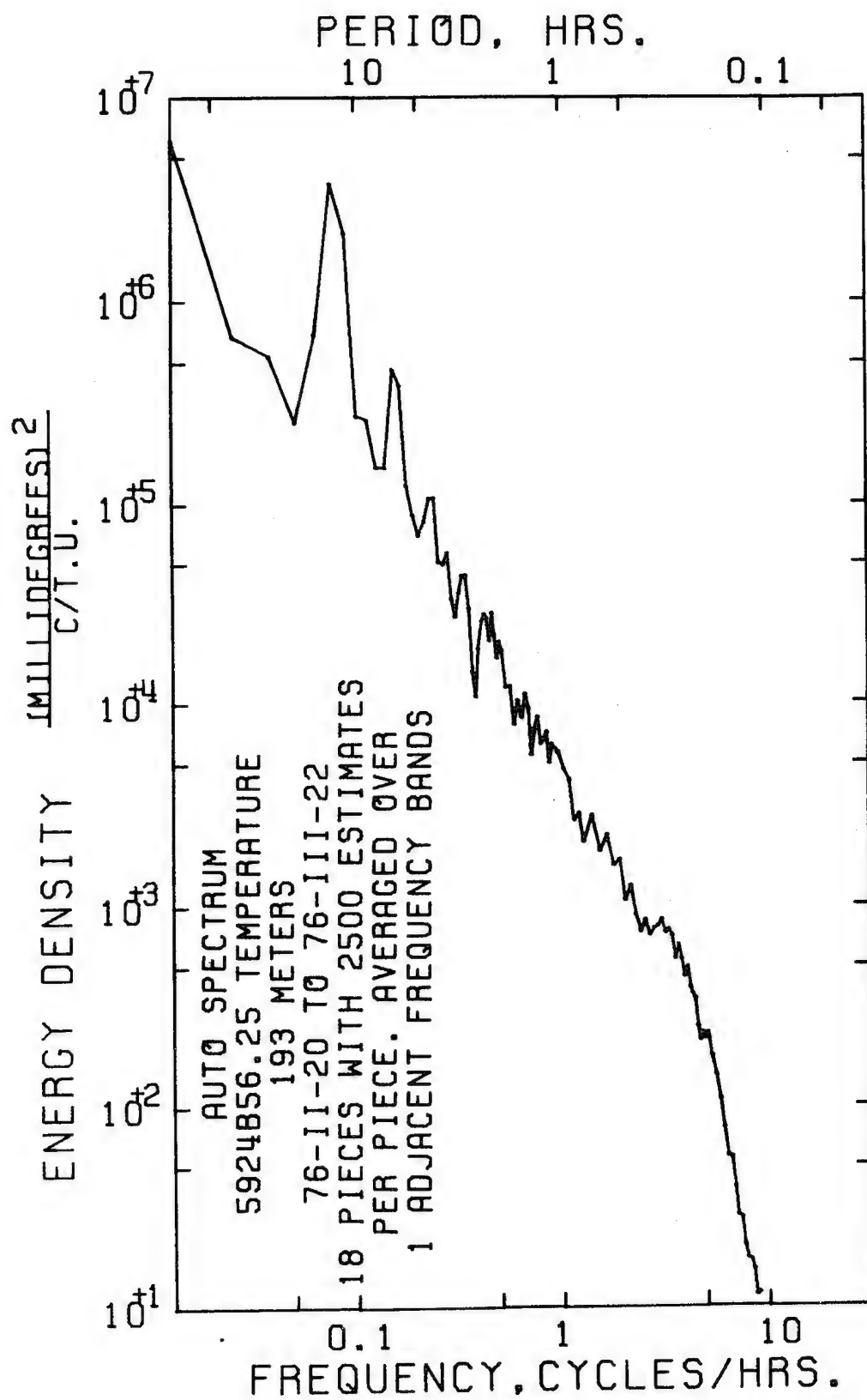


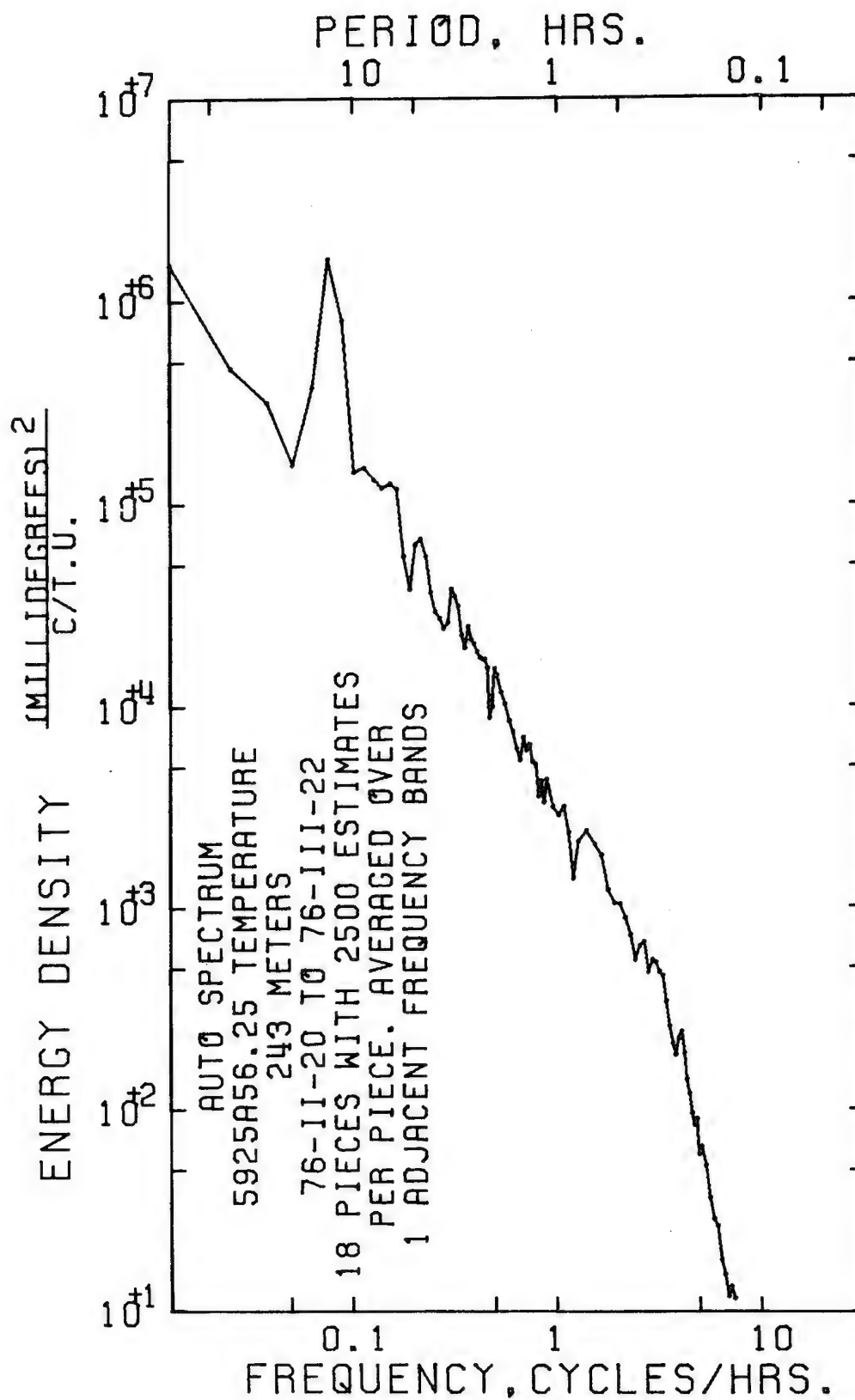


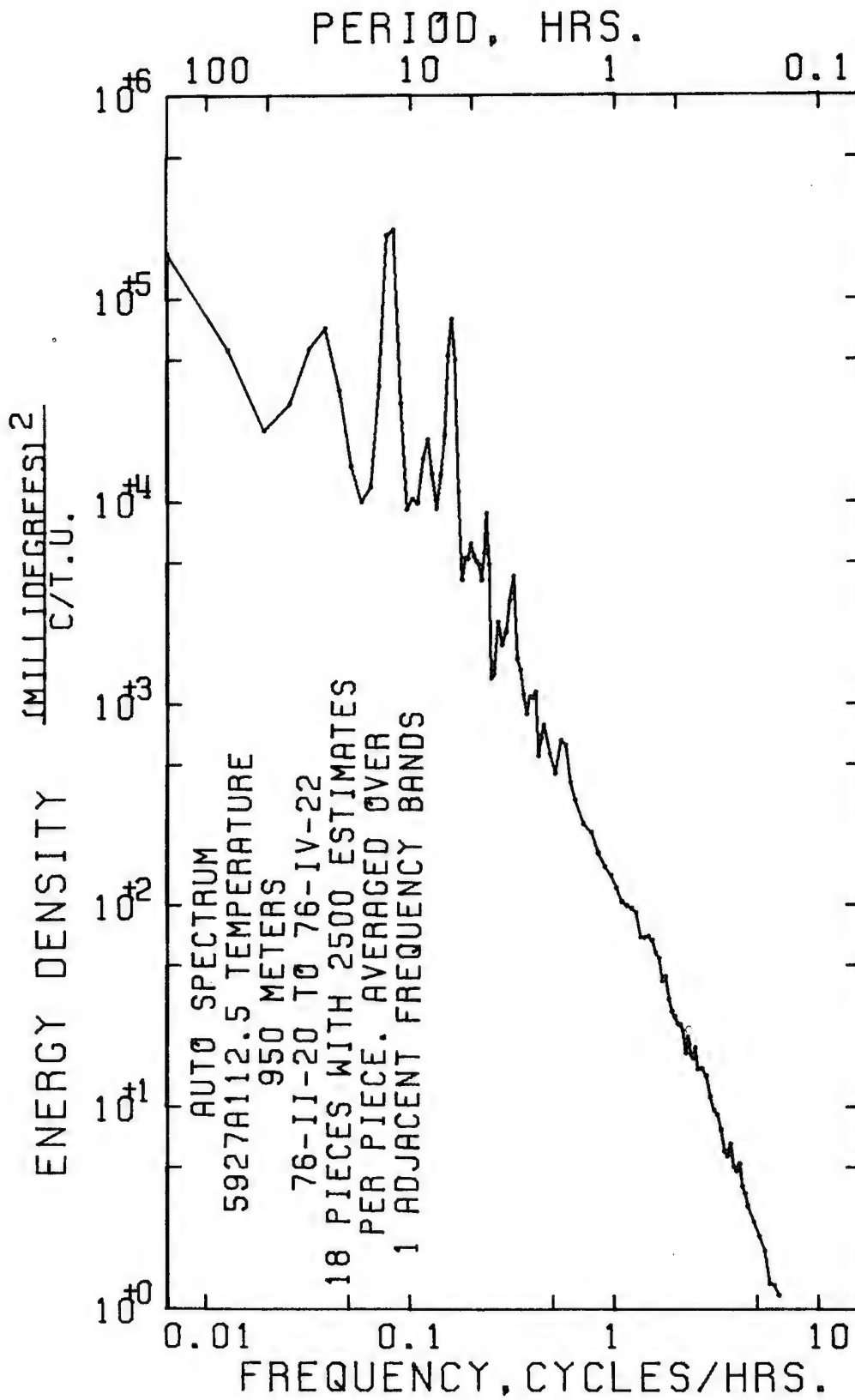


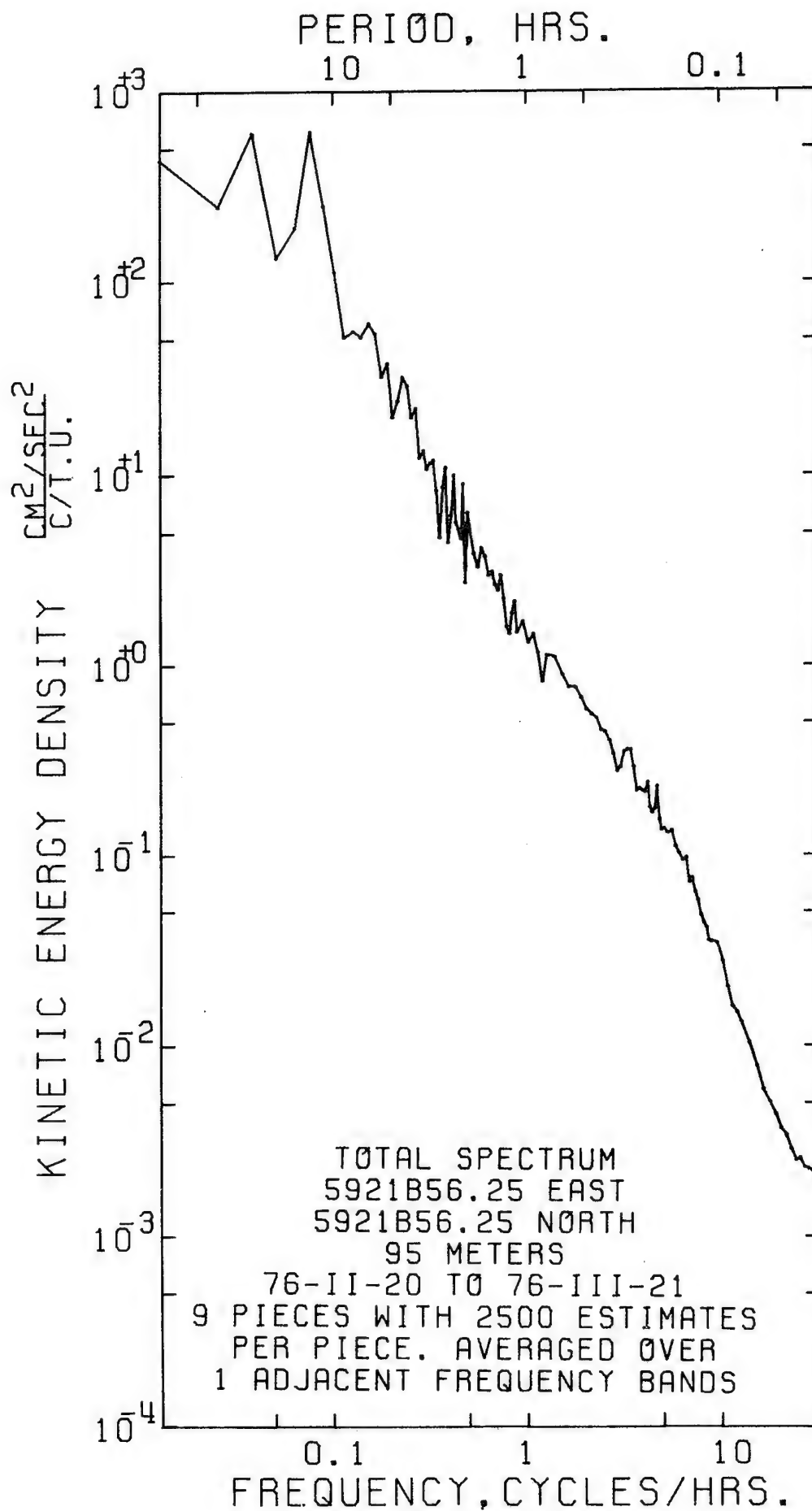


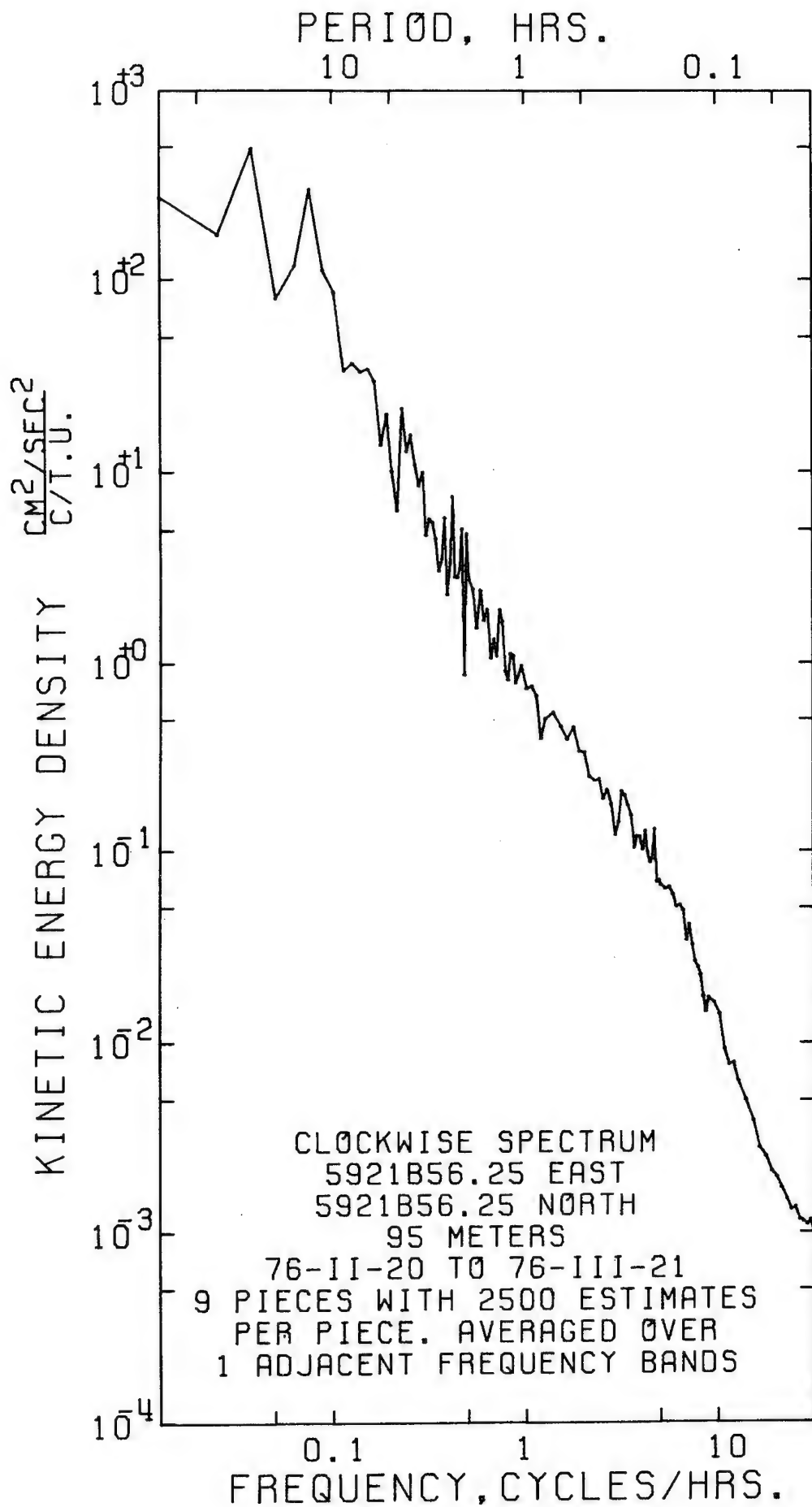


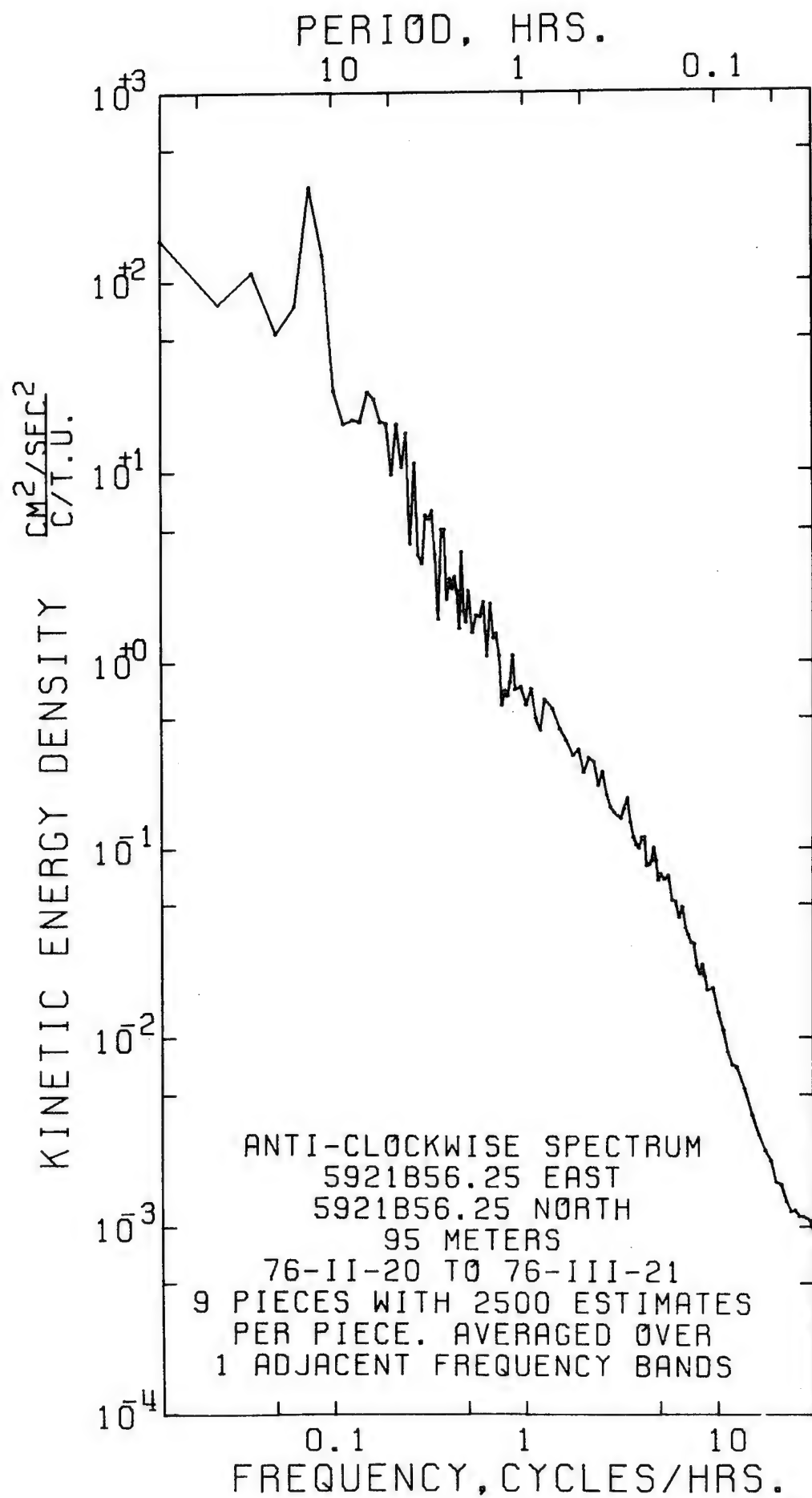


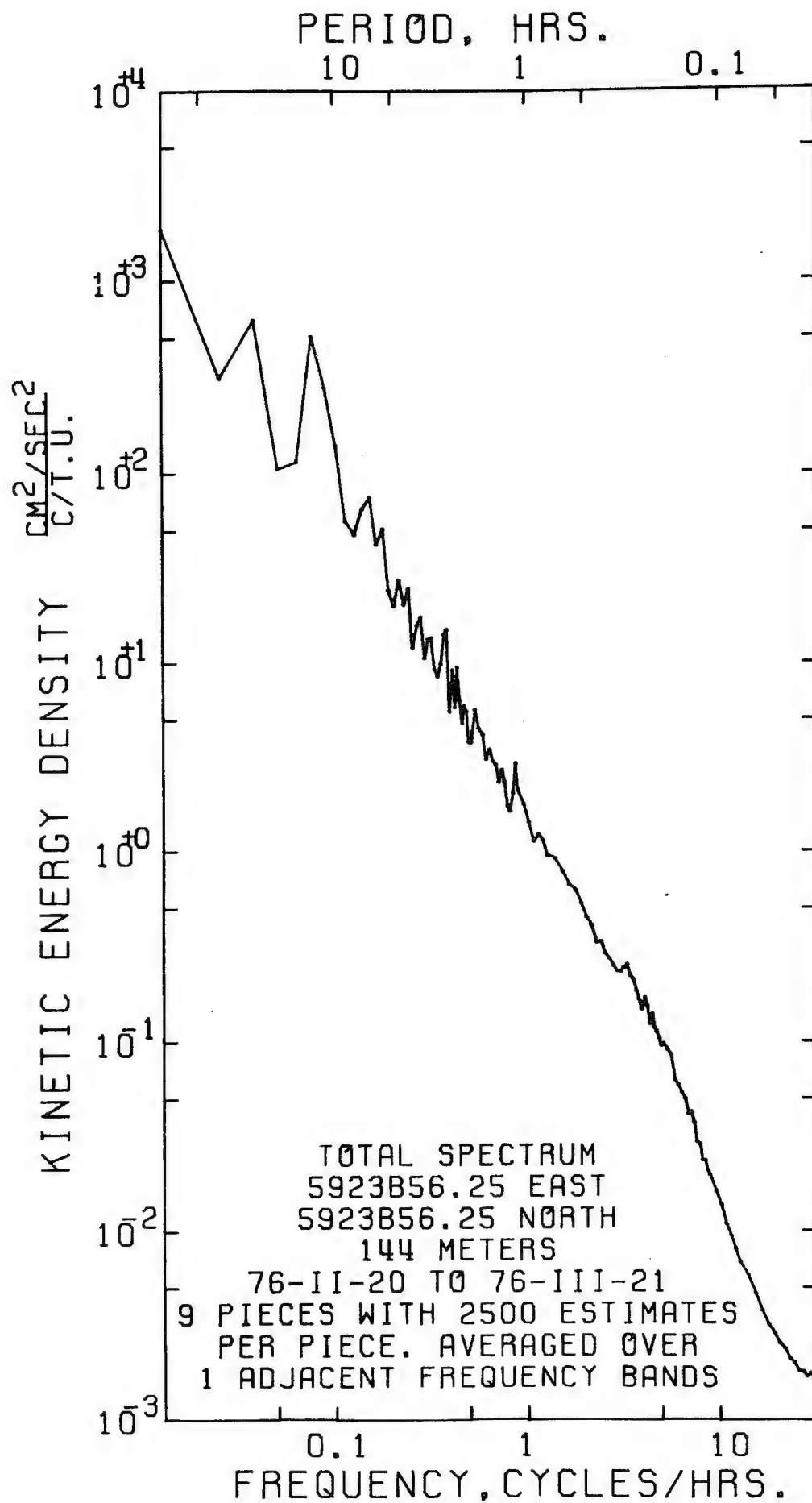


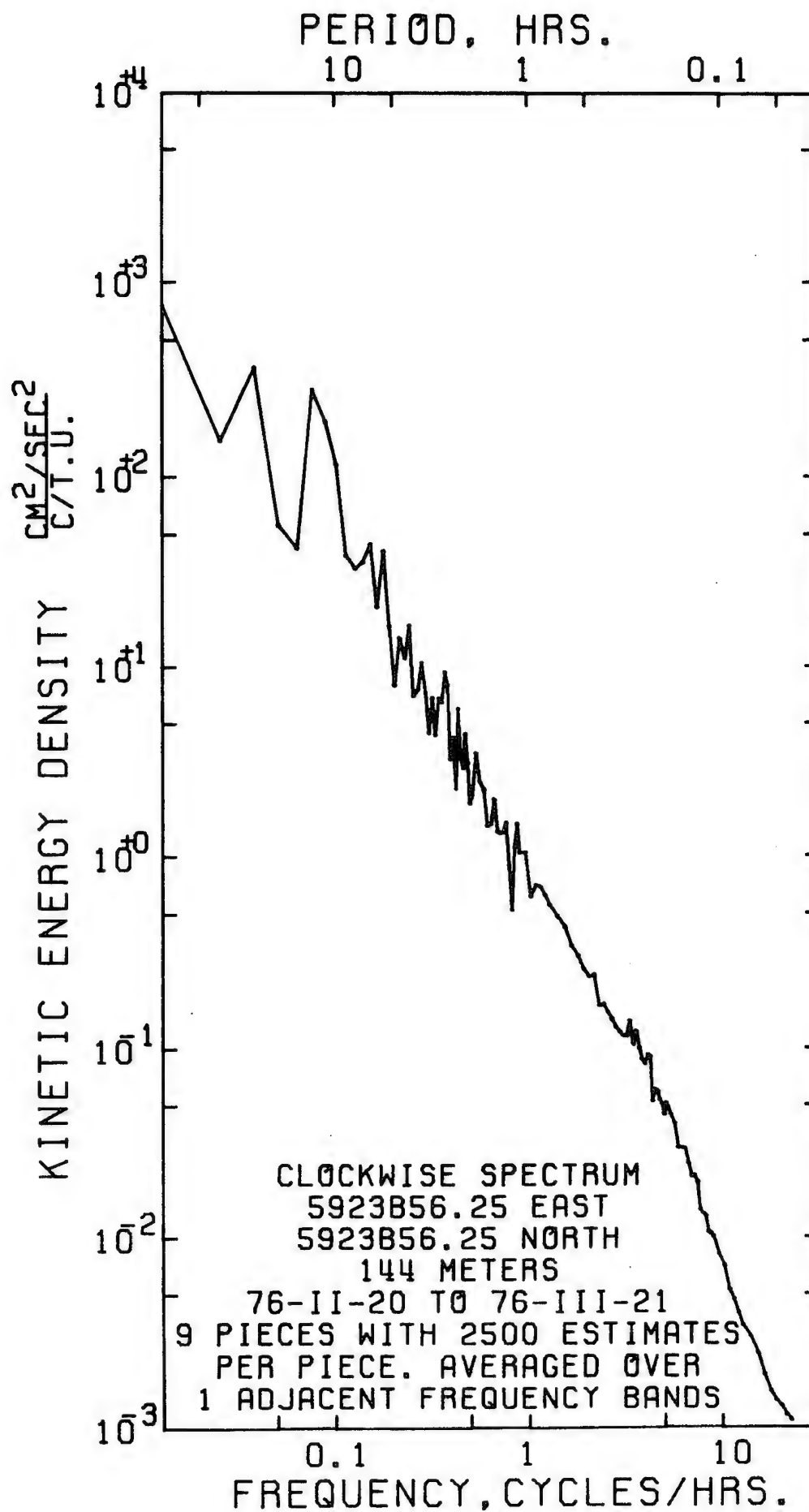


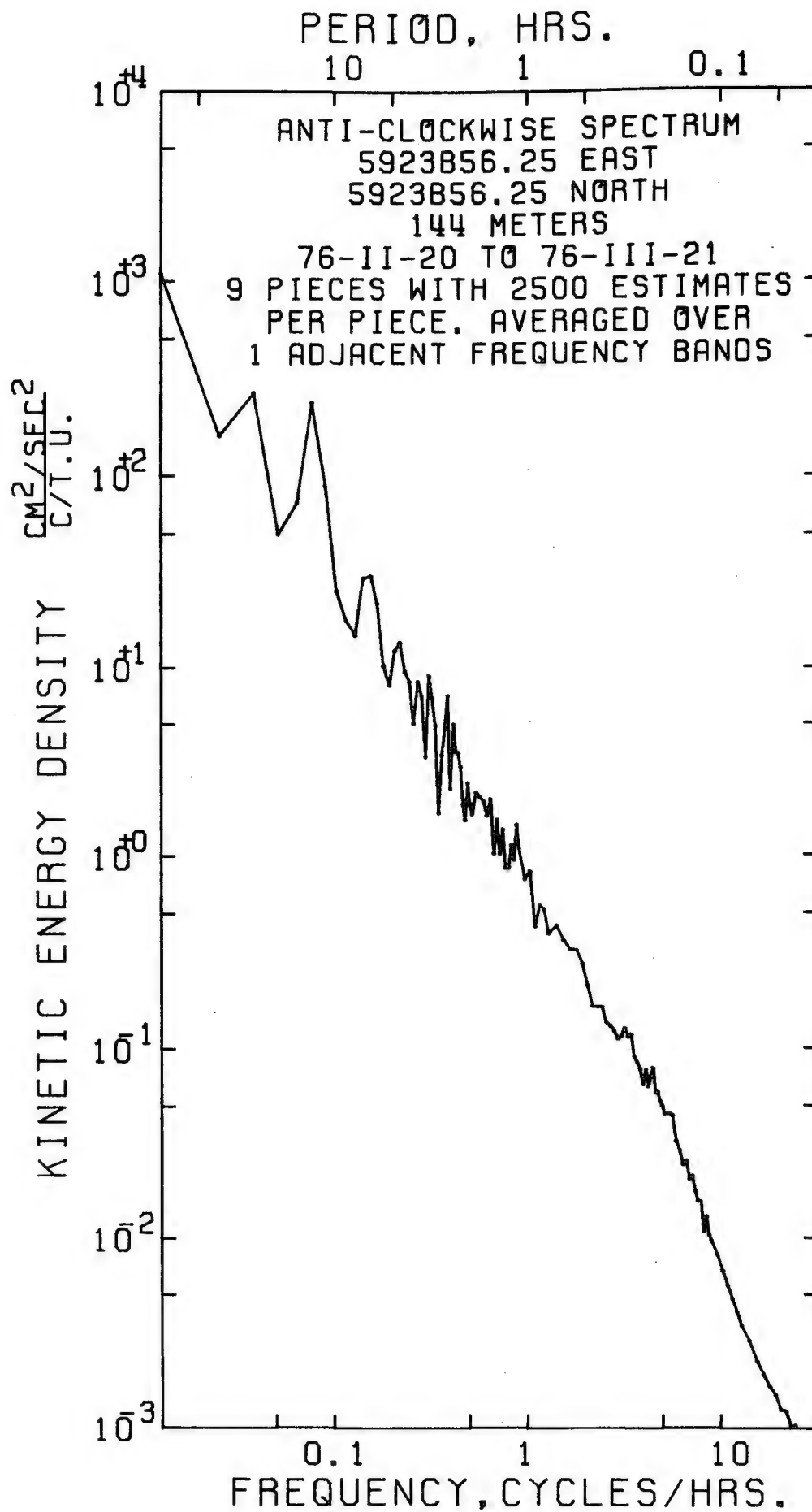


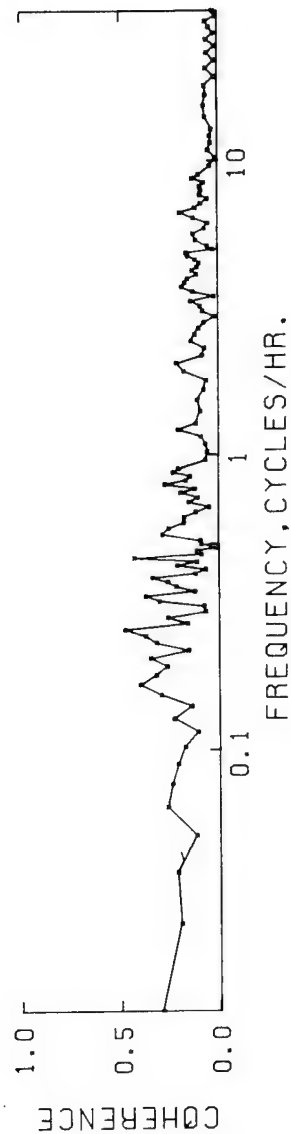
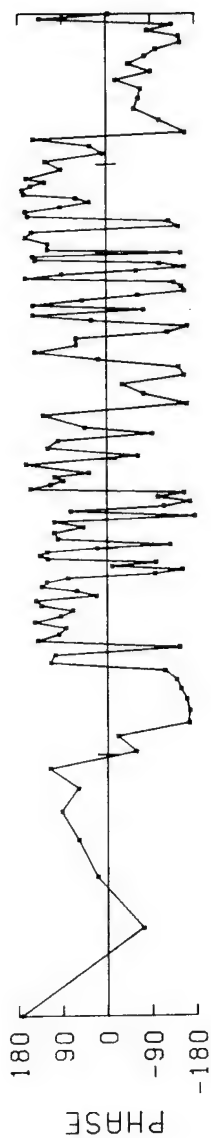




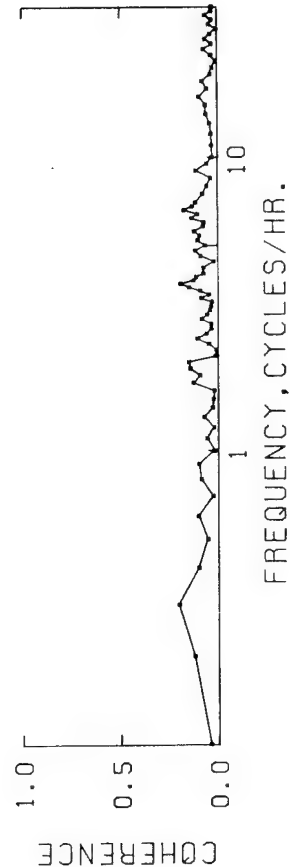
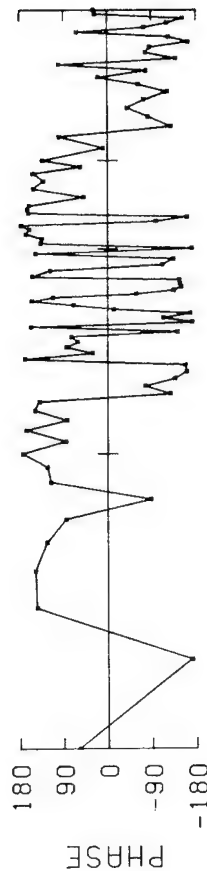




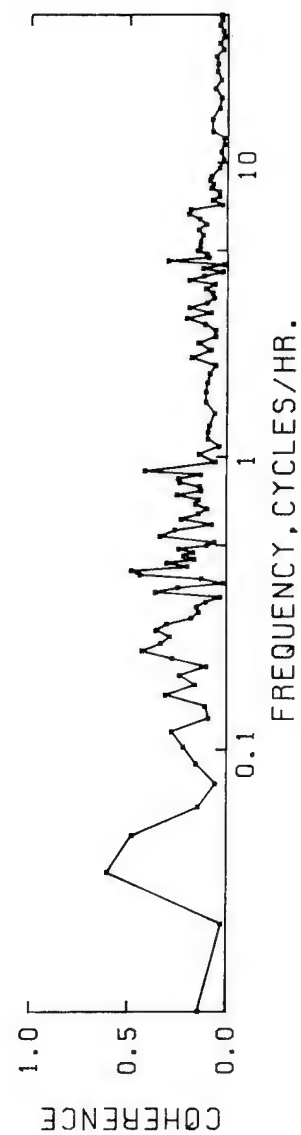
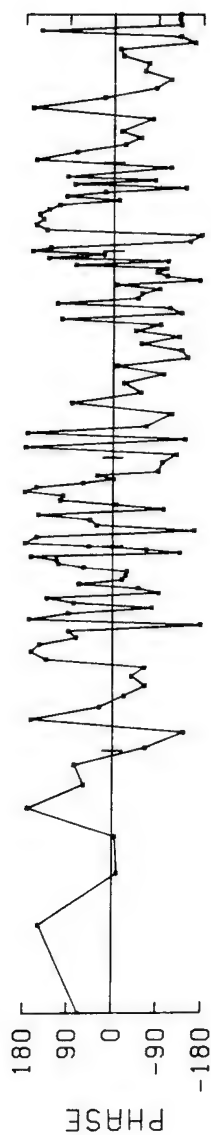




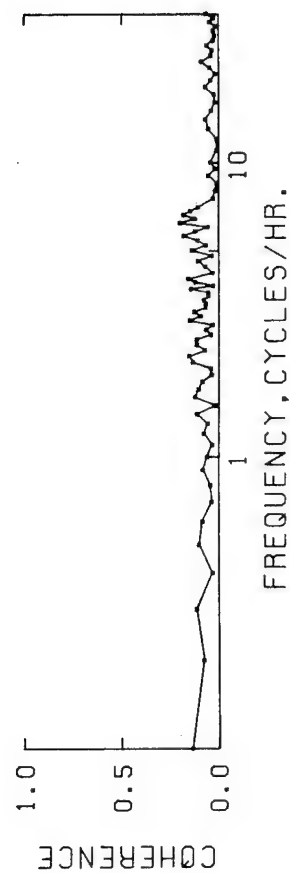
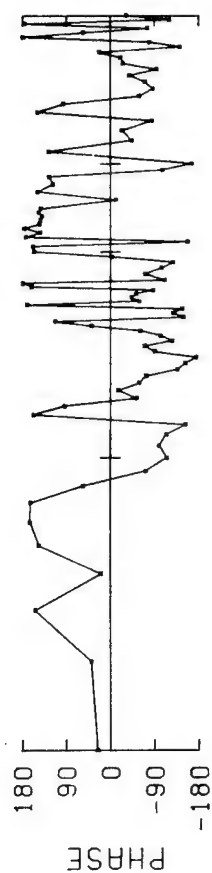
CROSS-SPECTRUM
 5921856.25 EAST
 5923856.25 EAST
 76-11-20 TO 76-11-22
 18 PIECES WITH 2500 ESTIMATES
 PER PIECE. AVERAGED OVER
 1 ADJACENT FREQUENCY BANDS



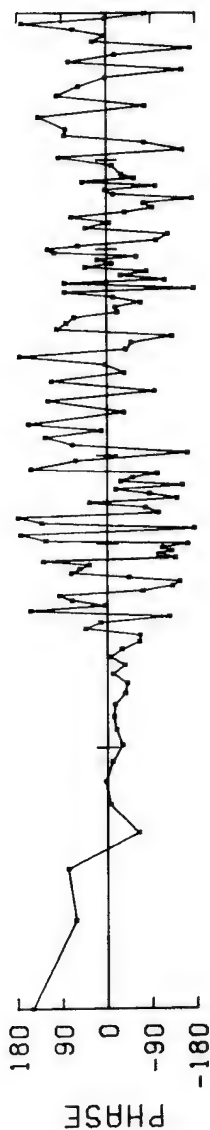
CROSS-SPECTRUM
 5921856.25 EAST
 5923856.25 EAST
 76-11-20 TO 76-11-22
 148 PIECES WITH 320 ESTIMATES
 PER PIECE. AVERAGED OVER
 1 ADJACENT FREQUENCY BANDS



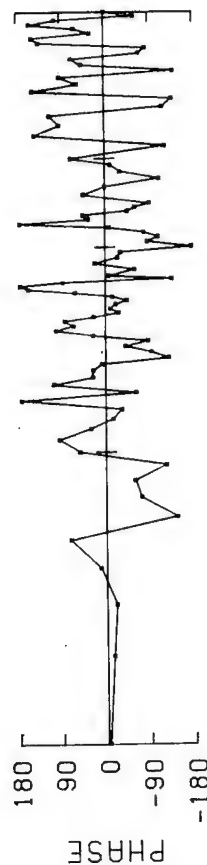
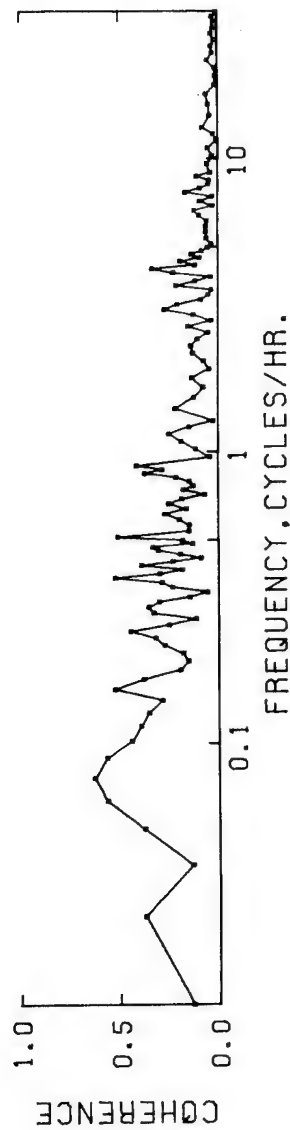
CROSS-SPECTRUM
 5921856.25 NORTH
 5923856.25 NORTH
 76-II-20 TO 76-III-22
 18 PIECES WITH 2500 ESTIMATES
 PER PIECE. AVERAGED OVER
 1 ADJACENT FREQUENCY BANDS



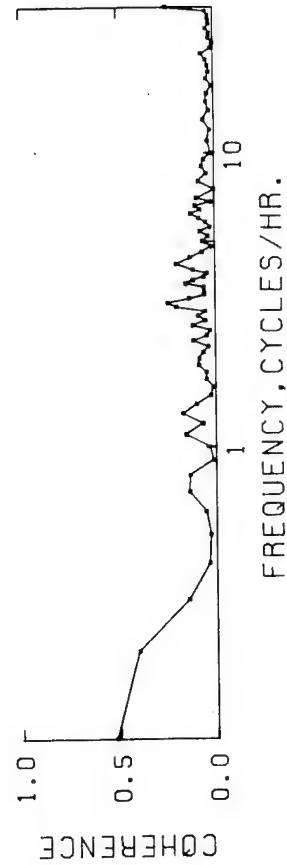
CROSS-SPECTRUM
 5921856.25 NORTH
 5923856.25 NORTH
 76-II-20 TO 76-III-22
 148 PIECES WITH 320 ESTIMATES
 PER PIECE. AVERAGED OVER
 1 ADJACENT FREQUENCY BANDS



CROSS-SPECTRUM
 5921856.25 TEMPERATURE
 5923856.25 TEMPERATURE
 76-11-20 TO 76-111-22
 18 PIECES WITH 2500 ESTIMATES
 PER PIECE. AVERAGED OVER
 1 ADJACENT FREQUENCY BANDS



CROSS-SPECTRUM
 5921856.25 TEMPERATURE
 5923856.25 TEMPERATURE
 76-11-20 TO 76-111-22
 148 PIECES WITH 320 ESTIMATES
 PER PIECE. AVERAGED OVER
 1 ADJACENT FREQUENCY BANDS



TWO-SIDED CROSS-SPECTRUM

18:53 MAY 03, 1977

SERIES 1	A1	5921856.25	EAST	START	760220	190028	STOP	760321	20701	SAMPLING RATE	56.25	SECONDS
SERIES 1	A2	5921856.25	NORTH	START	760220	190028	STOP	760321	20701	SAMPLING RATE	56.25	SECONDS
SERIES 2	A1	5923856.25	EAST	START	760220	190028	STOP	760321	20701	SAMPLING RATE	56.25	SECONDS
SERIES 2	A2	5923856.25	NORTH	START	760220	190028	STOP	760321	20701	SAMPLING RATE	56.25	SECONDS

SPECTRUM OF SERIES WITH 45000 POINTS DIVIDED INTO 9 PIECES WITH 5000 POINTS IN EACH PIECE.
2500 ESTIMATES AVERAGED OVER 1 ADJACENT FREQUENCY BANDS TO GIVE 2500 AVERAGED ESTIMATES.

SPECTRUM UNITS (MM/S)
UNITS OF TIME (T.U.) ARE HOURS

ANTI-CLOCKWISE COMPONENTS
(POSITIVE FREQUENCIES)

CLOCKWISE COMPONENTS
(NEGATIVE FREQUENCIES)

EST NO	FREQ CYC/T.U.	SPECTRUM SERIES 1	SPECTRUM SERIES 2	CROSS SPECTRUM	CBW. PHASE	SPECTRUM SERIES 1	SPECTRUM SERIES 2	CROSS SPECTRUM	CBW. PHASE	PERIOD T.U.	EST NO
0	.000	.60242E 02	.42465E 02	.44422E 02	.88	.60242E 02	.42465E 02	.44422E 02	.88	.00	0
1	.013	.61264E 02	.16558E 03	.81494E 02	.29	.14062E 03	.11022E 03	.58927E 02	.47	.78.13	1
2	.026	.95241E 02	.26225E 02	.39741E 02	.40	.73342E 02	.38582E 02	.40039E 02	.75	.39.06	2
3	.038	.58501E 02	.97819E 02	.54300E 02	.72	.18912E 02	.15512E 03	.76947E 02	.45	.26.04	3
4	.051	.12226E 03	.92758E 02	.94449E 02	.36	.60704E 02	.31270E 02	.37006E 02	.85	.19.53	4
5	.064	.48000E 02	.31017E 02	.34265E 02	.89	.18744E 02	.12294E 02	.17344E 01	.27	.15.63	5
6	.077	.30269E 02	.37476E 02	.1281E 02	.62	.52314E 02	.63924E 02	.74749E 01	.13	.13.02	6
7	.090	.47099E 02	.17529E 02	.19037E 02	.57	.10107E 02	.76422E 01	.80551E 00	.09	.11.16	7
8	.102	.10035E 02	.94425E 01	.56136E 01	.66	.25727E 02	.35603E 01	.71800E 01	.52	.9.77	8
9	.115	.68866E 01	.45721E 01	.13867E 01	.58	.81370E 01	.45619E 01	.57549E 01	.81	.8.68	9
10	.128	.13549E 02	.10031E 02	.38542E 01	.33	.14182E 01	.63332E 01	.25765E 01	.94	.7.81	10
11	.141	.12848E 02	.17997E 01	.27797E 01	.170	.26435E 02	.31222E 01	.26609E 01	.27	.7.10	11
12	.154	.15021E 02	.41739E 01	.44874E 01	.59	.25784E 02	.17666E 02	.12354E 02	.58	.6.51	12
13	.166	.18114E 02	.68581E 01	.77779E 01	.57	.49714E 01	.11532E 02	.28530E 01	.38	.6.01	13
14	.179	.10268E 02	.72817E 01	.72817E 01	.72	.73008E 01	.44471E 01	.42898E 01	.10	.5.58	14
15	.192	.22341E 02	.25941E 01	.64366E 01	.84	.12829E 02	.16584E 01	.42907E 01	.3	.5.21	15
16	.205	.93336E 01	.25377E 01	.23056E 01	.83	.13364E 02	.43377E 01	.30761E 01	.47	.4.88	16
17	.218	.37628E 01	.12009E 01	.12849E 01	.60	.77388E 01	.62033E 01	.46178E 01	.57	.4.60	17
18	.230	.24731E 01	.54371E 01	.96436E 00	.26	.53587E 01	.62033E 01	.40668E 01	.71	.4.34	18
19	.243	.82949E 01	.14381E 01	.17956E 01	.34	.12544E 02	.31259E 01	.37141E 01	.59	.4.11	19
20	.256	.48322E 01	.31287E 01	.25202E 01	.58	.16564E 02	.20547E 01	.36658E 01	.63	.3.91	20
21	.269	.65548E 01	.13901E 01	.56204E 00	.19	.17619E 01	.25662E 01	.16991E 01	.80	.3.72	21
22	.282	.20197E 01	.43876E 01	.17251E 01	.58	.18034E 01	.17137E 01	.91361E 00	.52	.3.55	22
23	.294	.29541E 01	.13659E 01	.58274E 00	.29	.12889E 01	.32436E 01	.24618E 01	.88	.3.40	23
24	.307	.36182E 01	.13098E 01	.92769E 00	.46	.24040E 01	.39588E 01	.14098E 01	.63	.3.26	24
25	.320	.21506E 01	.16348E 01	.93436E 00	.49	.40634E 01	.47901E 01	.21302E 01	.43	.3.13	25
26	.333	.94961E 00	.23902E 01	.36682E 00	.24	.35799E 01	.59161E 00	.27672E 00	.19	.3.00	26
27	.346	.48057E 01	.18921E 01	.20173E 01	.67	.13212E 01	.29632E 01	.67814E 00	.34	.2.89	27
28	.358	.47499E 00	.29406E 01	.0946E 00	.35	.20588E 01	.32355E 01	.10099E 01	.39	.2.79	28
29	.371	.59262E 00	.26670E 01	.86602E 00	.69	.26660E 01	.97950E 00	.80523E 00	.57	.2.69	29
30	.384	.40407E 01	.30283E 01	.28698E 01	.82	.37871E 01	.11944E 01	.10101E 01	.47	.2.60	30
31	.397	.11816E 01	.87705E 00	.82276E 00	.61	.59647E 00	.89431E 00	.15858E 00	.28	.2.52	31
32	.410	.86651E 00	.15026E 01	.66146E 00	.58	.95427E 00	.73640E 00	.47150E 01	.06	.2.44	32
33	.422	.17366E 01	.11070E 01	.6950E 00	.34	.12364E 01	.63348E 00	.24511E 00	.28	.2.37	33
34	.435	.11436E 01	.61076E 00	.31935E 00	.38	.16007E 01	.13382E 01	.10577E 01	.71	.2.30	34
35	.448	.12076E 01	.63302E 00	.20292E 00	.23	.17534E 01	.24090E 01	.12302E 01	.60	.2.23	35
36	.461	.13013E 01	.82474E 00	.46726E 00	.45	.17437E 01	.86554E 00	.10269E 01	.84	.2.17	36
37	.474	.12979E 01	.11037E 01	.98054E 00	.82	.55087E 01	.17163E 01	.16839E 01	.53	.2.11	37
38	.486	.18172E 01	.65705E 00	.40020E 00	.37	.17684E 01	.21185E 01	.10487E 01	.54	.2.06	38
39	.499	.85332E 00	.65782E 00	.31364E 00	.42	.19822E 01	.12820E 01	.11192E 01	.70	.2.00	39

40	1.512	22591E 01	11348E 01	14138E 01	88	160	93472E 00	76179E 00	57624E 00	80	142	1.95
41	538	18024E 01	70770E 00	54461E 00	48	137	10535E 01	21693E 01	67954E 00	32	61	1.91
42	535	33569E 00	78766E 00	16360E 00	32	77	92852E 00	23528E 00	22188E 00	47	144	1.86
43	550	13658E 01	32242E 00	48569E 00	73	27	95102E 00	25374E 00	37742E 00	63	38	1.82
44	563	69237E 00	58576E 00	24928E 00	39	77	1232E 01	17896E 01	15105E 01	70	74	1.78
45	576	13007E 01	11828E 01	57038E 00	46	36	26004E 01	17896E 01	15105E 01	70	82	1.74
46	589	54509E 00	40740E 00	32214E 00	68	124	14451E 01	65876E 00	77758E 00	80	55	1.70
47	602	52747E 00	99576E 00	37823E 00	52	37	14669E 01	64735E 00	49127E 00	51	140	1.66
48	614	10852E 01	10478E 01	71962E 00	67	149	98799E 00	86298E 00	47209E 00	54	143	1.63
49	627	15278E 01	28983E 00	37837E 00	57	40	81784E 00	30366E 00	22061E 00	54	143	1.59
50	640	20571E 01	23965E 00	16611E 00	24	27	64044E 00	85233E 00	47334E 00	64	104	1.56
51	653	56850E 00	51601E 00	38205E 00	71	177	14399E 01	15283E 01	11392E 01	77	11	1.53
52	666	90108E 01	17926E 01	81393E 00	64	87	85605E 00	89462E 00	14186E 00	16	28	1.50
53	678	12086E 01	84650E 00	11927E 00	12	112	78632E 00	63114E 00	32806E 00	47	4	1.47
54	691	13204E 01	41304E 00	44632E 00	60	62	11340E 01	12870E 01	40202E 00	33	120	1.45
55	704	14570E 01	28951E 00	46319E 00	71	177	12355E 01	40160E 00	14358E 00	20	114	1.42
56	717	61546E 00	44593E 00	35437E 00	68	71	13039E 01	39701E 00	65783E 00	91	172	1.40
57	730	24419E 00	32085E 00	35712E 00	55	142	16643E 01	22309E 00	51386E 00	84	48	1.37
58	742	35333E 00	41573E 00	30152E 00	94	143	11991E 01	59125E 00	41168E 00	49	69	1.35
59	755	42698E 00	31577E 00	23309E 00	64	125	84944E 00	17109E 00	28478E 00	75	64	1.32
60	768	69677E 00	91970E 00	45436E 00	57	27	12034E 01	27422E 00	45971E 00	80	40	1.30
61	781	58231E 00	18235E 00	10338E 00	32	89	27700E 00	27053E 00	13013E 00	42	80	1.28
62	794	85998E 00	27703E 00	97852E 01	20	81	45782E 00	35263E 00	25034E 00	63	153	1.26
63	806	31205E 00	46766E 00	20850E 00	55	62	16785E 01	42261E 00	16885E 00	20	124	1.24
64	819	42698E 00	10517E 01	52845E 00	79	35	10370E 01	58200E 00	41913E 00	54	15	1.20
65	832	57829E 00	56665E 00	40254E 00	61	103	77174E 00	53292E 00	27461E 00	39	43	1.18
66	845	44726E 00	58940E 00	15343E 00	42	74	4441E 00	74244E 00	15391E 00	17	157	1.15
67	858	77771E 00	68276E 00	33777E 00	59	62	51134E 00	34469E 00	78765E 01	19	24	1.13
68	870	48341E 00	10429E 00	22698E 00	86	19	68129E 00	46164E 00	30994E 00	53	26	1.12
69	883	66612E 00	72983E 01	21471E 01	11	70	7238E 00	91242E 00	70725E 00	87	42	1.10
70	896	56521E 00	29044E 00	15235E 00	48	55	32694E 00	10693E 00	12275E 00	66	90	1.09
71	909	34651E 00	36497E 00	15008E 00	46	36	11024E 01	32423E 00	45544E 00	76	8	1.07
72	922	29078E 00	49177E 00	35604E 00	69	168	66054E 00	77133E 00	36522E 00	51	44	1.06
73	934	53727E 00	64391E 00	14633E 00	33	97	37824E 00	21782E 00	22629E 00	79	118	1.04
74	947	30322E 00	28491E 00	14963E 00	34	107	1178E 01	28147E 00	31411E 00	55	156	1.03
75	960	68688E 00	53949E 00	72883E 01	17	171	68914E 00	35945E 00	12660E 00	25	58	1.01
76	973	33593E 00	29668E 00	99070E 01	42	67	12134E 00	12955E 00	87613E 01	70	41	1.00
77	986	18392E 00	10081E 01	27219E 00	65	14	82894E 00	13407E 00	19607E 00	59	116	1.00
78	998	77516E 00	20768E 00	78612E 01	18	152	71274E 00	23487E 00	18421E 00	46	51	1.00
79	1011	22683E 00	44462E 00	17700E 00	82	136	63954E 00	21777E 00	14244E 00	38	170	1.00
80	1024	79543E 00	22144E 00	17955E 00	57	49	71505E 00	44743E 00	42962E 01	08	177	1.00
81	1037	21530E 00	25343E 00	71066E 01	20	126	50974E 00	43186E 00	24245E 00	52	131	1.00
82	1050	47563E 00	20277E 00	13123E 00	42	115	14901E 00	53782E 00	23439E 00	79	20	1.00
83	1062	50799E 00	17033E 00	20101E 00	68	126	60574E 00	34516E 00	30189E 00	66	46	1.00
84	1075	22905E 00	20123E 00	12449E 00	58	161	59051E 00	10605E 00	74743E 01	30	88	1.00
85	1101	12689E 00	20857E 00	22165E 00	51	138	48624E 00	57774E 00	38078E 00	72	153	1.00
86	1114	49370E 00	14379E 00	24197E 00	91	66	31334E 00	53128E 00	27699E 00	83	23	1.00
87	1126	39457E 00	30998E 00	16644E 00	48	54	13184E 00	40998E 00	13046E 00	56	128	1.00
88	1139	54550E 00	15355E 00	24300E 00	48	179	27980E 00	22822E 00	11867E 00	47	115	1.00
89	1152	26944E 00	12770E 00	90380E 01	49	41	82994E 00	11913E 00	14485E 00	46	9	1.00
90	1165	20584E 00	98125E 01	23819E 01	17	2	33394E 00	43798E 00	11948E 00	56	108	1.00
91	1178	20301E 00	82855E 01	10431E 00	80	50	10925E 00	44586E 00	16999E 00	91	17	1.00
92	1190	18468E 00	18455E 00	17738E 00	47	21	16984E 00	25866E 00	20170E 00	81	57	1.00
93	1203	12121E 00	29004E 00	47312E 01	20	155	41331E 00	48497E 00	19527E 00	44	22	1.00
94	1216	44811E 00	22383E 00	32888E 00	94	122	55774E 00	27269E 00	30049E 00	77	118	1.00
95	1229	11621E 01	77720E 01	11912E 00	40	130	63524E 00	18613E 00	21178E 00	62	121	1.00

100	1.280	1.5844E 00	1.3435E 00	1.0740E 00	.74	.67.	.4748E 00	.5672E-01	1.0150E 00	.62	.97.	.78	100
101	1.293	.72501E 00	.32039E 00	.22723E 00	.47	.157.	.2768AE 00	.63511E 00	.16492E-01	.04	.22.	.77	101
102	1.306	.53474E 00	.32939E 00	.14405E 00	.34	.180.	.53977E 00	.18738E 00	.14544E 00	.44	.92.	.77	102
103	1.318	.27450E 00	.12872E 00	.15468E 00	.82	.27.	.45202E 00	.17954E 00	.22205E 00	.79	.9.	.76	103
104	1.331	.36438E 00	.28034E 00	.13698E 00	.43	.102.	.67668E 00	.26919E 00	.53901E-01	.13	.158.	.75	104
105	1.344	.18374E 00	.27542E 00	.20473E 00	.91	.23.	.32828E 00	.20307E 00	.21677E 00	.84	.76.	.74	105
106	1.357	.96821E 00	.17127E 00	.10228E 00	.58	.109.	.84737E-01	.32725E 00	.15463E 00	.93	.67.	.74	106
107	1.370	.33133E 00	.12130E 00	.23753E 00	.69	.121.	.21130E 00	.48604E-01	.37471E-01	.37	.168.	.73	107
108	1.382	.35901E 00	.79228E-01	.12971E 00	.77	.114.	.44619E 00	.84132E-01	.36112E-01	.19	.178.	.72	108
109	1.395	.58329E 00	.12633E 00	.21341E 00	.78	.133.	.36092E 00	.23134E 00	.50417E-01	.17	.106.	.71	109
110	1.408	.15819E 00	.23129E 00	.60011E-01	.31	.10.	.38544E 00	.22077E 00	.14117E 00	.48	.143.	.70	110
111	1.421	.33059E 00	.63602E-01	.69291E-01	.48	.9.	.36984E 00	.16711E 00	.15887E 00	.64	.144.	.70	111
112	1.434	.33474E 00	.83776E-01	.11558E 00	.69	.3.	.18159E 00	.27550E 00	.12823E 00	.57	.23.	.69	112
113	1.446	.75986E 00	.32230E 00	.25152E 00	.51	.11.	.24634E 00	.22662E 00	.57949E-01	.25	.106.	.69	113
114	1.459	.13745E 00	.26483E 00	.44978E-01	.24	.111.	.30248E 00	.15411E 00	.78521E-01	.36	.164.	.68	114
115	1.472	.27575E 00	.45727E 00	.19156E 00	.54	.165.	.37712E 00	.47293E 00	.27134E 00	.64	.5.	.67	115
116	1.485	.37991E 00	.11731E 00	.17255E 00	.82	.107.	.68717E 00	.32177E 00	.33088E 00	.70	.1.	.67	116
117	1.498	.64169E 00	.19454E 00	.24610E 00	.70	.90.	.32008E 00	.16617E 00	.42992E-01	.13	.115.	.66	117
118	1.510	.65604E-01	.79442E-01	.42756E-01	.59	.170.	.15004E 00	.26221E 00	.83433E-01	.45	.63.	.66	118
119	1.523	.17578E 00	.18602E 00	.13822E 00	.76	.72.	.47964E 00	.15984E 00	.25248E 00	.91	.95.	.65	119
120	1.536	.43416E 00	.36244E 00	.11740E 00	.30	.37.	.21402E 00	.25183E 00	.88883E-01	.38	.84.	.65	120
121	1.549	.24586E 00	.13748E 00	.62514E-01	.34	.156.	.24544E 00	.16706E 00	.88821E-01	.44	.97.	.64	121
122	1.562	.22535E 00	.26238E 00	.10302E 00	.42	.112.	.13542E 00	.21389E 00	.11146E 00	.65	.143.	.64	122
123	1.574	.21333E 00	.14833E 00	.78310E-01	.44	.86.	.46382E 00	.12104E 00	.85224E-01	.40	.176.	.63	123
124	1.587	.40248E 00	.13175E 00	.72066E-01	.31	.39.	.43692E 00	.14135E 00	.18094E 00	.73	.99.	.63	124
125	1.600	.38248E 00	.31197E-01	.57463E-01	.53	.129.	.88318E-01	.27153E 00	.46966E-01	.55	.58.	.62	125
126	1.613	.15253E 00	.85015E-01	.91183E-01	.80	.176.	.39455E 00	.77716E-01	.16260E 00	.91	.10.	.62	126
127	1.626	.24453E 00	.77272E-01	.10779E 00	.78	.156.	.23674E 00	.10376E 00	.13245E 00	.85	.124.	.61	127
128	1.638	.45859E 00	.28279E 00	.16676E 00	.46	.22.	.26322E 00	.15690E 00	.10309E 00	.51	.17.	.61	128
129	1.651	.17214E 00	.23504E 00	.19215E 00	.96	.21.	.10194E 00	.25078E-01	.21284E-01	.42	.141.	.60	129
130	1.664	.18344E 00	.12362E 00	.13075E 00	.87	.69.	.67618E 00	.90929E-01	.20879E 00	.84	.38.	.60	130
131	1.677	.30831E 00	.41222E-01	.78091E-01	.70	.118.	.63882E 00	.10007E 00	.16267E 00	.64	.59.	.59	131
132	1.690	.17828E 00	.33514E 00	.18971E 00	.78	.13.	.12514E 00	.16932E 00	.21606E-01	.13	.71.	.59	132
133	1.702	.53332E 00	.27255E 00	.31743E 00	.83	.60.	.24644E 00	.36777E 00	.13426E 00	.65	.22.	.58	133
134	1.715	.20323E 00	.55799E-01	.50361E-01	.43	.161.	.85754E 00	.55986E-01	.11924E 00	.54	.86.	.58	134
135	1.728	.24131E 00	.20578E 00	.10239E 00	.50	.149.	.65189E 00	.49165E 00	.29417E 00	.52	.13.	.57	135
136	1.741	.33428E 00	.12898E 00	.19991E 00	.96	.138.	.47224E 00	.13952E 00	.12200E 00	.45	.23.	.57	136
137	1.754	.19247E 00	.44600E-01	.42690E-01	.46	.78.	.30999E 00	.12731E 00	.10196E 00	.51	.16.	.57	137
138	1.766	.42095E 00	.92044E-01	.14744E 00	.75	.82.	.36088E 00	.13690E 00	.95789E-01	.43	.121.	.56	138
139	1.779	.35479E 00	.71210E-01	.34946E-01	.22	.27.	.68544E 00	.13952E 00	.57847E-01	.19	.12.	.56	139
140	1.792	.23915E 00	.44854E-01	.80090E-01	.77	.32.	.14374E 00	.22420E 00	.60156E-01	.34	.91.	.55	140
141	1.805	.49028E 00	.31627E 00	.65842E-01	.17	.141.	.49884E-01	.26543E 00	.64159E-01	.54	.16.	.55	141
142	1.818	.16440E 00	.13679E 00	.13071E 00	.87	.122.	.21194E 00	.70821E-01	.27691E-01	.23	.151.	.54	142
143	1.830	.16430E 00	.13721E 00	.22334E-01	.15	.175.	.26598E 00	.11505E 00	.13100E 00	.85	.117.	.54	143
144	1.843	.33016E 00	.12627E 00	.10456E 00	.51	.156.	.17350E 00	.54005E-01	.64647E-01	.67	.36.	.54	144
145	1.856	.25392E 00	.11242E 00	.93999E-01	.56	.41.	.52889E 00	.20081E 00	.15855E 00	.49	.152.	.54	145
146	1.869	.28419E 00	.45661E-01	.10691E 00	.94	.176.	.40594E 00	.66922E-01	.67670E-01	.41	.129.	.53	146
147	1.882	.19905E 00	.58556E-01	.42802E-01	.40	.113.	.25284E 00	.78322E-01	.54130E-01	.38	.14.	.53	147
148	1.894	.24364E 00	.68780E-01	.74006E-01	.57	.4.	.14502E 00	.15799E 00	.95573E-01	.63	.35.	.52	148
149	1.907	.11328E 00	.95645E-01	.83349E-01	.80	.14.	.24470E 00	.18786E 00	.93676E-01	.45	.35.	.52	149
150	1.920	.14458E 00	.66121E-01	.61842E-01	.63	.152.	.49514E 00	.17607E 00	.95907E-01	.32	.180.	.52	150
151	1.933	.15962E 00	.36802E-01	.33257E-01	.43	.76.	.51461E 00	.76145E-01	.11386E 00	.58	.136.	.51	151
152	1.946	.46793E 00	.70169E-01	.11316E 00	.62	.169.	.23465E 00	.98454E-01	.64255E-01	.43	.63.	.51	152
153	1.958	.31484E 00	.82653E-01	.86010E-01	.53	.164.	.30477E 00	.11855E 00	.11014E 00	.58	.51.	.50	153
154	1.971	.88736E-01	.15706E 00	.74499E-01	.63	.128.	.22562E 00	.89706E-01	.31805E-01	.22	.100.	.50	154
155	1.984	.30181E 00	.18045E 00	.14579E 00	.67	.102.	.34554E 00	.94626E-01	.87259E-01	.48	.178.	.50	155
156	1.997	.14234E 00	.81620E-01	.83358E-01	.72	.99.	.31249E 00	.72044E-01	.10372E 00	.69	.25.	.49	156
157	2.010	.28399E 00	.11200E 00	.9387E-01	.55	.94.	.28769E 00	.73179E-01	.86615E-01	.60	.96.	.49	157
158	2.022												158
159	2.035												159

160	2.048	92167E-01	21579E-01	38705E-01	87	156	2084E 00	63300E-01	90497E-01	79	76	49	160
161	2.061	29170E 00	42912E-01	22655E-01	20	1	8701E-01	18943E 00	27683E-01	22	8	49	161
162	2.074	30127E 00	48670E-01	48911E-02	04	79	1284E 00	16879E 00	11524E 00	80	91	48	162
163	2.086	19409E 00	33225E-01	37550E-01	47	84	19037E 00	63719E-01	71789E-01	65	22	48	163
164	2.099	26729E 00	39608E-01	50387E-01	49	177	83519E-01	14143E 00	75595E-01	70	100	48	164
165	2.112	42662E 00	15909E 00	16024E 00	62	83	1505E 00	21100E 00	37934E-01	21	168	47	165
166	2.125	23644E 00	79554E-01	26629E-01	49	2	2525E 00	55823E-01	22328E-01	19	82	47	166
167	2.138	16620E 00	31345E-01	28841E-01	40	60	3378E 00	61138E-01	10061E 00	70	175	47	167
168	2.150	37913E 00	26216E 00	10587E 00	34	20	1215E 00	14968E 00	10542E 00	79	85	47	168
169	2.163	14555E 00	91791E-01	25287E-01	22	57	78234E-01	37855E-01	20366E-01	37	128	46	169
170	2.176	20732E 00	62537E-01	1039E 00	91	71	7284E 00	86032E-01	19637E 00	78	142	46	170
171	2.189	17153E 00	15974E 00	6853E-01	40	130	62487E-01	10728E 00	47276E-01	58	165	46	171
172	2.202	88968E-01	11496E 00	64835E-01	64	136	82767E-01	99167E-01	45817E-01	51	146	45	172
173	2.214	41080E 00	83520E-01	97211E-01	52	46	5741E-01	10680E 00	29436E-01	38	178	45	173
174	2.227	63386E 00	54197E-01	82561E-01	45	105	21079E 00	17149E 00	14768E 00	78	176	45	174
175	2.240	22749E 00	42686E-01	55361E-01	56	34	41413E 00	49245E-01	4237E-01	30	163	45	175
176	2.253	13587E 00	70975E-01	89485E-01	91	63	83824E-01	73547E-01	4872E-01	62	149	44	176
177	2.266	27415E 00	65852E-01	55082E-01	41	69	1584E 00	12893E 00	81683E-01	83	8	44	177
178	2.278	20632E 00	44310F-01	62105E-01	65	56	17897E 00	10236E 00	11211E 00	53	128	44	178
179	2.291	10527E 00	10307E 00	11041E-01	11	95	3270E 00	10722E-01	31670E-01	53	144	44	179
180	2.304	41123E 00	50885E-01	74068E-01	51	129	18391E 00	13986E 00	36061E-01	74	171	43	180
181	2.317	31050E 00	82718E-01	12003E 00	75	80	17629E 00	92765E-01	94798E-01	82	144	43	181
182	2.330	84958E-01	51730E-01	51615E-01	78	117	2204E 00	12352E 00	60936E-01	37	99	43	182
183	2.342	10451E 00	96857E-01	30042E-01	30	103	2195E 00	15347E-01	76033E-01	59	88	43	183
184	2.355	37920E 00	61803E-01	43432E-01	28	60	14681E 00	38879E-01	40033E-01	54	59	42	184
185	2.368	20638E 00	55953E-01	46719E-01	43	38	10024E 00	91232E-01	54753E-01	57	71	42	185
186	2.381	25547E 00	19261E-01	47004E-01	67	18	28081E 00	13094E 00	12579E 00	66	22	42	186
187	2.394	61935E-01	10269E 00	30994E-01	39	161	9169E-01	18614E-01	29156E-01	71	178	42	187
188	2.406	17332E 00	94654E-01	80176E-01	68	5	3778E 00	81924E-01	89378E-01	51	129	42	188
189	2.419	20541E 00	56495E-01	64408E-01	60	48	17952E 00	40955E-01	40257E-01	47	14	41	189
190	2.432	25326E 00	15379E 00	10256E 00	52	147	16594E 00	15551E-01	17579E-01	35	83	41	190
191	2.445	10832E 00	36287E-01	39188E-01	63	69	1334E 00	56028E-01	63153E-01	73	157	41	191
192	2.458	44739E 00	16453E 00	11917E 00	44	92	15352E 00	52131E-01	50537E-01	56	169	41	192
193	2.470	92708E-01	72122E-01	63236E-01	77	173	12107E 00	15389E 00	50246E-01	36	64	40	193
194	2.483	14887E 00	56293E-01	69063E-01	75	20	14752E 00	10239E 00	25493E-01	21	33	40	194
195	2.496	60314E-01	48161E-01	13682E-01	25	95	14355E 00	86426E-01	26610E-01	24	39	40	195
196	2.509	29269E 00	5580E-01	21036E-01	16	138	17363E-01	56118E-01	25204E-01	38	77	40	196
197	2.522	26121E 00	94693E-01	45160E-01	29	158	23604E 00	84345E-01	65640E-01	47	56	40	197
198	2.534	36545E 00	48484E-01	10287E 00	77	31	17400E 00	93037E-01	84678E-01	67	4	39	198
199	2.547	14719E 00	50996E-01	37754E-01	44	157	48587E-01	10771E 00	10169E-01	14	50	39	199
200	2.560	85127E-01	39754E-01	22374E-01	38	141	2700E 00	98503E-01	62888E-01	39	81	39	200
201	2.573	14278E 00	84783E-01	60988E-01	55	169	1185E 00	18310E 00	96030E-01	65	86	39	201
202	2.586	35379E 00	16245E 00	68954E-01	64	123	44189E-01	66731E-01	40307E-02	70	138	39	202
203	2.598	24517E 00	13641E 00	66438E-01	33	155	2709E 00	74631E-01	13994E 00	78	18	38	203
204	2.611	96141E-01	13641E 00	55487E-01	48	125	29327E 00	68942E-01	53986E-01	38	148	38	204
205	2.624	10667E 00	33174E-01	34803E-01	59	100	72254E-01	40965E-01	12152E-01	22	97	38	205
206	2.637	57456E-01	41158E-01	33019E-01	68	15	35084E-01	94836E-01	41485E-01	72	38	38	206
207	2.650	76557E-01	52482E-01	20212E-01	32	102	25594E 00	23820E-01	48100E-01	62	110	38	207
208	2.662	58595E-01	54353E-01	54353E-01	70	10	1200E 00	65608E-01	59930E-01	67	95	38	208
209	2.675	64294E-01	68292E-01	68292E-01	68	104	2902E 00	45669E-01	73239E-01	63	1	37	209
210	2.688	49118E-01	20401E-01	20401E-01	24	48	1000E 00	37618E-01	23855E-01	39	119	37	210
211	2.701	22575E-01	36584E-01	36584E-01	93	149	19642E-01	54842E-01	18071E-01	55	123	37	211
212	2.714	89657E-01	35317E-01	33533E-01	60	96	10544E 00	57603E-01	54537E-01	70	106	37	212
213	2.726	57809E-01	78524E-01	32710E-01	49	15	2482E 00	67517E-01	72841E-01	54	49	37	213
214	2.739	1654E 00	64798E-01	41113E-01	40	101	14934E 00	47900E-01	34822E-01	41	169	37	214
215	2.752	52793E-01	52793E-01	34169E-01	40	132	5034E-01	17195E 00	33067E-01	42	123	36	215
216	2.765	3120E 00	54128E-01	95196E-01	73	88	16864E 00	51591E-01	66774E-01	72	177	36	216
217	2.778	23928E 00	11281E 00	15449E 00	94	40	8828E-01	90750E-02	17434E-01	62	176	36	217
218	2.790	16494E-01	44623E-01	94777E-02	34	17	4892E-01	45828E-01	8717E-02	18	43	36	218
219	2.803	35870E 00	45049E-01	88976E-01	70	13	14029E 00	67561E-01	61354E-01	63	0	36	219

220	2.816	.66021E+01	.26524E+01	.14598E+01	.35	.22.	.13697E 00	.10352E+01	.19667E+01	.52	.134.	.36
221	2.829	.15131E 00	.42954E+01	.58325E+01	.72	.62.	.14043E 00	.11618E 00	.27467E+01	.22	.100.	.35
222	2.842	.11528E 00	.10930E 00	.33811E+01	.30	.150.	.28698E+01	.11030E 00	.20584E+01	.37	.175.	.35
223	2.854	.14833E 00	.41735E+01	.43691E+01	.56	.129.	.14444E 00	.73599E+01	.81132E+01	.79	.165.	.35
224	2.867	.14722E 00	.25256E+01	.54769E+01	.90	.44.	.72484E+01	.60981E+01	.54495E+01	.82	.178.	.35
225	2.880	.63628E+01	.15151E+01	.11378E+01	.37	.176.	.80543E+01	.41312E+01	.15354E+01	.27	.121.	.35
226	2.893	.66602E+01	.15742E+01	.16966E+01	.62	.41.	.70689E+01	.78887E+01	.24064E+01	.38	.34.	.35
227	2.906	.63228E+01	.50504E+01	.37693E+01	.67	.83.	.11244E 00	.18242E+01	.26855E+01	.59	.109.	.34
228	2.918	.76378E+01	.41548E+01	.11803E+01	.21	.122.	.11869E 00	.49142E+01	.28244E+01	.37	.79.	.34
229	2.931	.16742E 00	.64859E+01	.19246E+01	.18	.102.	.19507E 00	.26303E+01	.10776E+01	.15	.135.	.34
230	2.944	.18504E 00	.25789E+01	.21820E+01	.32	.164.	.16834E 00	.10065E 00	.11552E 00	.89	.92.	.34
231	2.957	.12871E 00	.35740E+01	.41717E+01	.62	.53.	.10444E 00	.15715E 00	.70163E+01	.59	.18.	.34
232	2.970	.20972E 00	.67905E+01	.55479E+01	.46	.66.	.15532E 00	.36288E+01	.56172E+01	.75	.112.	.34
233	2.982	.24753E 00	.36519E+01	.54728E+01	.58	.95.	.21131E 00	.64484E+01	.52230E+01	.43	.6.	.34
234	2.995	.91033E+01	.14902E 00	.58569E+01	.50	.148.	.11342E 00	.63683E+01	.10201E+01	.12	.6.	.33
235	3.008	.21180E+01	.29197E+01	.99970E+02	.13	.180.	.58848E+01	.78337E+01	.52480E+01	.77	.140.	.33
236	3.021	.15723E 00	.54101E+01	.52426E+01	.57	.163.	.12047E+01	.72705E+01	.12798E+01	.43	.83.	.33
237	3.034	.16677E 00	.44680E+01	.74515E+01	.86	.121.	.19085E 00	.74701E+01	.48564E+01	.46	.141.	.33
238	3.046	.1126E 00	.15511E 00	.96156E+01	.76	.154.	.18857E 00	.42030E+01	.48756E+01	.60	.50.	.33
239	3.059	.1126E 00	.10351E 00	.70937E+01	.66	.81.	.12050E 00	.52426E+01	.61378E+01	.77	.32.	.33
240	3.072	.81980E+01	.10974E 00	.80447E+01	.85	.46.	.62858E+01	.48255E+01	.43084E+02	.08	.18.	.33
241	3.085	.88979E+01	.10727E 00	.31284E+01	.32	.54.	.16947E 00	.45517E+01	.32251E+01	.37	.77.	.32
242	3.098	.69471E+01	.24493E+01	.35437E+01	.86	.45.	.23994E 00	.45095E+01	.23505E+01	.23	.123.	.32
243	3.110	.54872E+01	.15698E+01	.17141E+01	.58	.14.	.10762E 00	.31542E+01	.25845E+01	.44	.19.	.32
244	3.123	.81719E+01	.16574E 00	.94451E+01	.81	.87.	.19234E 00	.35646E+01	.59079E+01	.71	.116.	.32
245	3.136	.11236E 00	.37810E+01	.45062E+02	.07	.69.	.17214E 00	.47883E+01	.38838E+01	.43	.109.	.32
246	3.149	.30613E 00	.73616E+01	.64791E+01	.43	.12.	.17264E 00	.21215E+01	.43654E+01	.72	.177.	.32
247	3.162	.28477E+01	.91409E+01	.38064E+01	.75	.98.	.12572E 00	.12482E 00	.40460E+02	.03	.86.	.32
248	3.174	.15396E 00	.91877E+01	.70844E+01	.60	.45.	.30132E 00	.93516E+01	.66460E+01	.40	.16.	.32
249	3.187	.93779E+01	.13577E+01	.92858E+01	.82	.51.	.16802E 00	.77129E+01	.61412E+01	.54	.103.	.31
250	3.200	.11466E 00	.43530F+01	.52474E+01	.74	.172.	.10928E 00	.43762E+01	.26734E+01	.39	.65.	.31
251	3.213	.32613E 00	.16738E+01	.16679E+01	.23	.120.	.17154E 00	.82921E+02	.18996E+01	.50	.93.	.31
252	3.226	.15645E 00	.41579E+01	.28138E+01	.35	.145.	.13274E 00	.63980E+01	.44287E+01	.48	.87.	.31
253	3.238	.19335E 00	.61156E+01	.23906E+01	.22	.151.	.25894E 00	.50786E+01	.75282E+01	.66	.120.	.31
254	3.251	.11438E 00	.20048E+01	.18199E+01	.38	.77.	.22440E 00	.90632E+01	.75696E+01	.53	.170.	.31
255	3.264	.61490E+01	.59026E+02	.48727E+02	.26	.35.	.48883E 00	.17868E+01	.20929E+01	.23	.67.	.31
256	3.277	.34316E 00	.83773E+01	.41310E+01	.48	.25.	.76777E+01	.72579E+01	.40381E+01	.54	.71.	.31
257	3.290	.51503E+01	.44181E+01	.22054E+01	.46	.51.	.13654E 00	.93259E+01	.88346E+01	.78	.172.	.30
258	3.302	.13707E 00	.27777E+01	.49620E+01	.80	.106.	.16405E 00	.43469E+01	.47401E+01	.56	.153.	.30
259	3.315	.25318E 00	.10606E 00	.12873E 00	.79	.111.	.10710E 00	.28679E+01	.21191E+01	.38	.35.	.30
260	3.328	.63007E+01	.49629E+01	.21087E+01	.38	.57.	.21584E 00	.23720E+01	.52142E+01	.73	.6.	.30
261	3.341	.16141E 00	.32415E+01	.69474E+02	.10	.138.	.10154E 00	.48013E+01	.85194E+02	.12	.109.	.30
262	3.354	.14393E 00	.59554E+01	.45204E+01	.49	.88.	.21601E 00	.50059E+01	.79295E+01	.76	.98.	.30
263	3.366	.92174E+01	.14604E 00	.61699E+01	.53	.159.	.16284E 00	.31516E+01	.51525E+01	.72	.99.	.30
264	3.379	.10159E 00	.10329E 00	.54230E+01	.53	.51.	.35034E 00	.49495E+01	.43299E+01	.33	.153.	.30
265	3.392	.10356E 00	.92342E+01	.28913E+01	.29	.66.	.95907E+01	.46963E+01	.37872E+01	.56	.167.	.29
266	3.405	.76822E+01	.56551E+01	.50000E+01	.76	.34.	.90132E+01	.42894E+01	.26548E+01	.43	.56.	.29
267	3.418	.49725E 00	.18965E+01	.68821E+01	.71	.56.	.10514E 00	.93143E+02	.17638E+01	.56	.150.	.29
268	3.430	.22116E 00	.20727E+01	.19019E+01	.28	.140.	.13532E 00	.13648E 00	.74309E+01	.55	.89.	.29
269	3.443	.82141E+01	.79109E+01	.63464E+01	.79	.14.	.93738E+01	.23258E+01	.27266E+01	.58	.176.	.29
270	3.456	.57562E+01	.50635E+01	.34870E+01	.65	.20.	.14506E 00	.27322E+01	.24716E+01	.39	.156.	.29
271	3.469	.11584E 00	.10146E 00	.48596E+01	.45	.8.	.14643E 00	.11894E 00	.87743E+01	.66	.101.	.29
272	3.482	.37459E+01	.44954E+01	.3227E+01	.79	.132.	.21757E 00	.12552E 00	.12552E 00	.82	.60.	.29
273	3.494	.20066E 00	.37330E+01	.65476E+01	.76	.153.	.21757E 00	.56067E+01	.32603E+01	.42	.4.	.29
274	3.507	.13307E 00	.29730E+01	.21872E+01	.35	.123.	.53689E+01	.98033E+01	.51525E+01	.71	.82.	.29
275	3.520	.73744E+01	.25830E+01	.24551E+01	.50	.44.	.95574E+01	.68547E+01	.69541E+01	.86	.71.	.28
276	3.533	.18291E 00	.70493E+01	.40833E+01	.36	.167.	.10984E 00	.85845E+01	.22195E+01	.23	.86.	.28
277	3.546	.10997E 00	.25969E+01	.40833E+01	.79	.160.	.95534E+01	.12056E+01	.17625E+01	.52	.19.	.28
278	3.558	.11887E 00	.89361E+01	.79587E+01	.77	.159.	.12584E 00	.11553E+01	.59271E+02	.15	.60.	.28
279	3.571	.22125E 00	.30121E+01	.64105E+01	.79	.44.	.21374E 00	.43084E+01	.84247E+01	.84	.113.	.28

280	3.584	98862E+01	52870E+01	224816E+01	34	113	85772E+01	61723E+01	48224E+01	66	63	28
281	3.597	2100E 00	52990E+01	50855E+02	05	8	15132E 00	88264E+01	49365E+01	43	83	28
282	3.610	1390E 00	40415E+01	12758E+01	17	88	52939E+01	58527E+01	10818E+01	19	174	28
283	3.622	2771E+01	42326E+01	1546E+01	48	107	80151E+01	55164E+01	4190E+01	62	175	28
284	3.635	1348E+01	33484E+01	76560E+02	36	126	74062E+01	68729E+01	30164E+01	42	99	28
285	3.648	1625E 00	33794E+01	38359E+01	52	125	15454E+01	10837E 00	11899E+01	29	163	27
286	3.661	6654E+01	67009E+01	41507E+01	24	99	22457E 00	50347E+01	33767E+01	32	8	27
287	3.674	8651E+01	17015E+01	4527E+02	11	30	10169E 00	59138E+01	33790E+01	39	55	27
288	3.686	2177E 00	47092E+01	80629E+01	80	109	39902E+01	39809E+01	30146E+01	76	146	27
289	3.699	1164E 00	36494E+01	31533E+01	48	11	55794E+01	40679E+01	17145E+01	36	10	27
290	3.712	6575E+01	31490E+01	28775E+01	63	112	92954E+01	14588E+01	21448E+01	58	169	27
291	3.725	77279E+01	59895E+01	26689E+01	39	6	16629E 00	33720E+01	55717E+01	74	108	27
292	3.738	2426E 00	29302E+01	11296E+01	13	129	21682E 00	24619E+01	11212E+01	15	141	27
293	3.750	6835E+01	5177E+01	32515E+01	55	121	10764E 00	32567E+01	26242E+01	44	99	27
294	3.763	6653E+01	58812E+01	27183E+01	43	54	56494E+01	34333E+01	31107E+01	71	80	27
295	3.776	4382E+01	65308E+01	41409E+01	76	59	60285E+01	34203E+01	20949E+01	46	23	26
296	3.789	5718E+01	42028E+01	37328E+01	76	59	10674E 00	46014E+01	33709E+01	48	141	26
297	3.802	7508E+01	32381E+01	11522E+01	23	22	70974E+01	85829E+01	67624E+01	87	110	26
298	3.814	67327E+01	40277E+01	20462E+01	39	171	18392E 00	77374E+01	70845E+01	59	114	26
299	3.827	1067E 00	22320E+01	46008E+02	09	151	11194E 00	20663E+01	31739E+01	66	155	26
300	3.840	82157E+01	28564E+01	39366E+01	81	40	24134E 00	12965E 00	71217E+01	40	177	26
301	3.853	1468E 00	37631E+01	51725E+01	78	171	53782E+01	4634E+01	38240E+01	77	57	26
302	3.866	8783E+01	32903E+01	24569E+01	46	33	81091E+01	63833E+01	32556E+01	45	26	26
303	3.878	18814E 00	41169E+01	44035E+01	50	44	95034E+01	49555E+01	17459E+01	37	115	26
304	3.891	90078E+01	27954E+01	13837E+01	28	102	11472E 00	84397E+01	23339E+01	24	25	26
305	3.904	7417E+01	37194E+01	29658E+01	56	119	83194E+01	25145E+01	19551E+01	43	164	26
306	3.917	8575E+01	48437E+01	50067E+01	78	123	14797E 00	31057E+01	16614E+01	25	19	26
307	3.930	20039E 00	46872E+01	47666E+01	49	7	14364E 00	51044E+01	19843E+01	23	150	25
308	3.942	1095E 00	10355E+01	1273E+01	37	35	50124E+01	37866E+01	21355E+01	49	106	25
309	3.955	41477E+01	47163E+01	14022E+01	32	84	78770E+01	53244E+01	36323E+01	56	129	25
310	3.968	1356E 00	39351E+01	41557E+01	57	112	31691E+01	16923E+01	11933E+01	52	88	25
311	3.981	22680E 00	66980E+01	13775E+01	11	52	10831E 00	37988E+01	23241E+01	36	151	25
312	3.994	10972E 00	38718E+01	18533E+01	28	93	11309E 00	90913E+01	45276E+01	45	56	25
313	4.006	14839E 00	71449E+01	57505E+01	56	50	13839E 00	48162E+01	61173E+01	79	139	25
314	4.019	12205E 00	38609E+01	11667E+01	17	33	11004E 00	50491E+01	55312E+01	74	143	25
315	4.032	25647E+01	25928E+01	74489E+02	29	46	54971E+01	96522E+01	21454E+01	29	31	25
316	4.045	83028E+01	34050E+01	44324E+01	84	93	94994E+01	48341E+01	17533E+01	29	130	25
317	4.058	49983E+01	67471E+01	30842E+01	53	3	81192E+01	24413E+01	38764E+01	87	39	25
318	4.070	27347E+01	13749E+01	10715E+01	55	39	16212E 00	72991E+01	10036E 00	92	55	25
319	4.083	27661E+01	50265E+01	20822E+01	55	39	66312E+01	30073E+01	16398E+01	37	51	24
320	4.096	74847E+01	31605E+01	22863E+01	47	117	15434E 00	69392E+01	56795E+01	55	155	24
321	4.109	14110E 00	14868E+01	17259E+01	38	108	11747E 00	13058E 00	80283E+02	06	46	24
322	4.122	19118E 00	47218E+01	7320E+01	77	140	64089E+01	48639E+01	20574E+01	37	128	24
323	4.134	91098E+01	31259E+01	49582E+01	93	109	111719E 00	55966E+01	68992E+01	85	17	24
324	4.147	63893E+01	5070E+01	18932E+01	35	26	2128E 00	33698E+01	26697E+01	29	115	24
325	4.160	15166E 00	2377E+01	33213E+01	55	149	27139E+01	54576E+01	15929E+01	46	89	24
326	4.173	1676E 00	65950E+01	55835E+01	53	144	2735E 00	27655E+01	53948E+01	61	67	24
327	4.186	14806E 00	11042E+01	19653E+01	49	35	28964E+01	10609E+01	10359E+01	59	149	24
328	4.198	65741E+01	16350E+01	28769E+01	88	84	93415E+01	63385E+01	32280E+01	42	52	24
329	4.211	62382E+01	10551E+01	10155E+01	40	60	13421E 00	39700E+01	35658E+02	05	4	24
330	4.224	69433E+01	14145E+01	44006E+02	14	95	12935E 00	96405E+02	19270E+01	53	89	24
331	4.237	29154E+01	53631E+01	11870E+01	30	79	69200E+01	43148E+01	17466E+01	32	78	24
332	4.250	96203E+01	56156E+01	31264E+01	43	40	85204E+01	27676E+01	14124E+01	29	0	24
333	4.262	10414E 00	79187E+01	37485E+01	41	132	13145E 00	11560E+01	20186E+01	52	161	23
334	4.275	97293E+01	55438E+01	12477E+01	17	103	82614E+01	63022E+01	20779E+01	29	19	23
335	4.288	62837E+01	49814E+01	12881E+01	23	47	8800E+01	20702E+01	52423E+02	12	6	23
336	4.301	43041E+01	4215E+01	1567E+01	36	137	80129E+01	51328E+01	30806E+01	43	153	23
337	4.314	41504E+01	42423E+01	18341E+01	58	105	80574E+01	15465E+01	171504E+01	48	130	23
338	4.326	75807E+01	44946E+01	39397E+01	68	87	1344E 00	25912E+01	32205E+01	53	46	23
339	4.339	93926E+01	37780E+01	11303E+01	19	101	45544E+01	42303E+01	30393E+01	69	115	23

TWO-SIDED SPECTRUM

15:05 APR 26, 1977

A1 = 5921856.25 EAST START 760220 190028 STOP 740321 20701 SAMPLING RATE 56.25 SECONDS
 A2 = 5921856.25 NORTH START 760220 190028 STOP 740321 20701 SAMPLING RATE 56.25 SECONDS

SPECTRUM OF SERIES WITH 45000 PRINTS DIVIDED INTO 9 PIECES WITH 5000 PRINTS IN EACH PIECE.
 2500 ESTIMATES AVERAGED OVER 1 ADJACENT FREQUENCY BANDS TO GIVE 2500 AVERAGED ESTIMATES.
 SPECTRUM UNITS (MM/S)
 UNITS OF TIME (T.U.) ARE HOURS
 ORIENTATIONS ARE CLOCKWISE FROM NORTH

ESTIMATE NUMBER	FREQUENCY CYCLES/T.U.	CLOCKWISE SPECTRUM	ANTI-CLOCKWISE SPECTRUM	TOTAL SPECTRUM	ROTARY COEFFICIENT	FLIPFSE ORIENTATION	ELLIPSE STABILITY	MEAN ORIENTATION	PERIOD T.U./CYCLE	ESTIMATE NUMBER
0	.000	.20864E-10	.20864E-10	.20864E-10	.000	51.	.40	63.	.00	0
1	.013	.34384E 03	.21222E 03	.55606E 03	.237	70.	.29	69.	78.13	1
2	.026	.21837E 03	.97470E 02	.31584E 03	.383	38.	.25	10.	39.06	2
3	.038	.62622E 03	.14251E 03	.76874E 03	.629	23.	.75	20.	26.04	3
4	.051	.10178E 03	.68264E 02	.17005E 03	.197	18.	.28	33.	19.53	4
5	.064	.15027E 03	.94964E 02	.24523E 03	.226	83.	.29	64.	15.63	5
6	.077	.38135E 03	.40471E 03	.78552E 03	.029	35.	.56	35.	13.02	6
7	.090	.14269E 03	.17615E 03	.31884E 03	.105	37.	.37	47.	11.16	7
8	.102	.10905E 03	.33873E 02	.14292E 03	.526	356.	.07	175.	9.77	8
9	.115	.42799E 02	.22781E 02	.65581E 02	.305	9.	.29	2.	8.68	9
10	.128	.46694E 02	.23887E 02	.70581E 02	.323	48.	.17	33.	7.81	10
11	.141	.42241E 02	.23315E 02	.65556E 02	.289	102.	.34	104.	7.10	11
12	.154	.43569E 02	.33522E 02	.77091E 02	.130	337.	.41	168.	6.81	12
13	.166	.37667E 02	.30703E 02	.68371E 02	.102	45.	.46	38.	6.01	13
14	.179	.17652E 02	.23306E 02	.40958E 02	.138	51.	.30	53.	5.58	14
15	.192	.25319E 02	.22775E 02	.48094E 02	.053	65.	.16	68.	5.21	15
16	.205	.12871E 02	.12394E 02	.25266E 02	.019	12.	.43	45.	4.88	16
17	.218	.81353E 01	.22619E 02	.30755E 02	.471	297.	.15	91.	4.60	17
18	.230	.27234E 02	.13437E 02	.40671E 02	.339	30.	.70	43.	4.34	18
19	.243	.16310E 02	.20324E 02	.36634E 02	.110	78.	.28	108.	4.11	19
20	.256	.19900E 02	.54781E 01	.25378E 02	.568	12.	.38	30.	3.91	20
21	.269	.13858E 02	.14154E 02	.28012E 02	.011	328.	.19	164.	3.72	21
22	.282	.10868E 02	.47780E 01	.15646E 02	.389	65.	.06	95.	3.55	22
23	.294	.12747E 02	.43033E 01	.17049E 02	.495	339.	.32	164.	3.40	23
24	.307	.60564E 01	.73459E 01	.13710E 02	.116	328.	.09	122.	3.26	24
25	.320	.73459E 01	.73459E 01	.14689E 02	.000	41.	.39	127.	3.13	25
26	.333	.58140E 01	.80669E 01	.15141E 02	.066	123.	.28	176.	3.00	26
27	.346	.70745E 01	.48034E 01	.10623E 02	.095	100.	.09	149.	2.89	27
28	.358	.39512E 01	.21781E 01	.61293E 01	.289	343.	.45	54.	2.79	28
29	.371	.45511E 01	.64797E 01	.11031E 02	.175	39.	.49	54.	2.69	29
30	.384	.74451E 01	.64865E 01	.11031E 02	.069	40.	.48	21.	2.60	30
31	.397	.29740E 01	.27847E 01	.13932E 02	.033	32.	.26	39.	2.52	31
32	.410	.43724E 01	.35847E 01	.79571E 01	.099	311.	.63	130.	2.44	32
33	.422	.95417E 01	.31840E 01	.12726E 02	.500	56.	.28	58.	2.37	33
34	.435	.36585E 01	.36371E 01	.73156E 01	.000	18.	.18	3.	2.30	34
35	.448	.36522E 01	.31013E 01	.67536E 01	.082	283.	.28	81.	2.23	35
36	.461	.05866E 01	.19466E 01	.60052E 01	.352	23.	.47	20.	2.17	36
37	.474	.65429E 01	.49503E 01	.11493E 02	.139	99.	.61	88.	2.11	37
38	.486	.11100E 01	.24033E 01	.35133E 01	.368	3.	.13	1.	2.06	38
39	.499	.61388E 01	.21080E 01	.82468E 01	.489	80.	.11	78.	2.00	39
40	.512	.35593E 01	.30876E 01	.66469E 01	.071	345.	.42	171.	1.95	40
41	.525	.41008E 01	.19307E 01	.60315E 01	.360	4.	.08	4.	1.91	41
42	.538	.22390E 01	.17632E 01	.40022E 01	.119	64.	.37	51.	1.86	42
43	.550	.18029E 01	.27246E 01	.45275E 01	.204	14.	.19	13.	1.82	43

44	563	21632E 01	18382E 01	40014E 01	.081	15.	.53	0.	1.78	44
45	576	236792E 01	22559E 01	66352E 01	.109	50.	.46	53.	1.74	45
46	589	25382E 01	15495E 01	4087E 01	.242	8.	.36	17.	1.70	46
47	602	14691E 01	33735E 01	48426E 01	.393	20.	.59	23.	1.66	47
48	614	28664E 01	20351E 01	49015E 01	.170	38.	.22	42.	1.63	48
49	627	29771E 01	11255E 01	41026E 01	.451	298.	.40	135.	1.59	49
50	640	19637E 01	16429E 01	36066E 01	.089	55.	.22	70.	1.56	50
51	653	15643E 01	27536E 01	43179E 01	.275	50.	.22	32.	1.53	51
52	666	11772E 01	25297E 01	37069E 01	.365	325.	.48	27.	1.50	52
53	678	18007E 01	13873E 01	3180E 01	.130	320.	.17	146.	1.47	53
54	691	16243E 01	20664E 01	36507E 01	.130	88.	.62	151.	1.45	54
55	704	17066E 01	25671E 01	42737E 01	.201	63.	.21	74.	1.43	55
56	717	10900E 01	10790E 01	21690E 01	.005	18.	.36	68.	1.42	56
57	730	23952E 01	11534E 01	35887E 01	.335	45.	.49	38.	1.40	57
58	742	25341E 01	15841E 01	41182E 01	.231	107.	.49	36.	1.37	58
59	755	19127E 01	60262E 00	25153E 01	.521	304.	.24	112.	1.35	59
60	768	23842E 01	7049E 00	32897E 01	.449	41.	.26	108.	1.32	60
61	781	13067E 01	12773E 01	25840E 01	.011	316.	.04	52.	1.30	61
62	794	10208E 01	52316E 00	15439E 01	.322	86.	.04	118.	1.26	62
63	806	10105E 01	67617E 00	16866E 01	.198	290.	.15	59.	1.24	63
64	819	10759E 01	10096E 01	20855E 01	.032	56.	.27	98.	1.22	64
65	832	12413E 01	86972E 00	21111E 01	.176	40.	.27	46.	1.20	65
66	845	16259E 01	11353E 01	27612E 01	.178	60.	.55	54.	1.18	66
67	858	13735E 01	11132E 01	24867E 01	.105	47.	.73	43.	1.17	67
68	870	14442E 01	16764E 01	31205E 01	.074	71.	.23	74.	1.15	68
69	883	35873E 00	86408E 00	12228E 01	.413	90.	.24	64.	1.13	69
70	896	16602E 01	56304E 00	26233E 01	.266	20.	.37	30.	1.12	70
71	909	13780E 01	13494E 01	27774E 01	.010	97.	.14	73.	1.10	71
72	922	68750E 00	11955E 01	18830E 01	.270	359.	.40	177.	1.07	72
73	934	90921E 00	72014E 00	16594E 01	.116	382.	.17	42.	1.06	73
74	947	12287E 01	74649E 00	19752E 01	.245	98.	.33	102.	1.04	74
75	960	20229E 01	70224E 00	2751E 01	.485	61.	.37	78.	1.03	75
76	973	99112E 00	87704E 00	18682E 01	.061	33.	.36	174.	1.01	76
77	986	63514E 00	47738E 00	11125E 01	.142	38.	.22	17.	1.01	77
78	998	10450E 01	85908E 00	1941E 01	.098	90.	.49	85.	1.00	78
79	1011	10847E 01	78630E 00	18710E 01	.160	40.	.28	48.	.99	79
80	1024	94780E 00	75780E 00	1756E 01	.111	43.	.65	44.	.98	80
81	1037	59949E 01	93845E 00	15379E 01	.220	55.	.63	71.	.96	81
82	1050	11334E 01	83117E 00	19646E 01	.154	55.	.71	53.	.95	82
83	1062	11688E 01	13311E 01	24999E 01	.065	24.	.19	29.	.94	83
84	1075	97064E 00	64749E 00	16181E 01	.207	323.	.05	134.	.93	84
85	1088	95634E 00	83683E 00	17532E 01	.067	336.	.11	2.	.92	85
86	1101	82847E 00	50142E 00	13299E 01	.246	53.	.39	64.	.91	86
87	1114	91830E 00	44842E 00	1367E 01	.344	320.	.25	99.	.90	87
88	1126	97334E 00	10428E 01	20161E 01	.034	338.	.31	179.	.88	88
89	1139	71016E 00	49187E 00	12020E 01	.182	6.	.26	27.	.87	89
90	1152	86167E 00	72824E 00	15859E 01	.084	62.	.51	57.	.86	90
91	1165	44132E 00	63502E 00	10763E 01	.180	99.	.18	98.	.85	91
92	1178	35048E 00	47241E 00	8289E 00	.148	319.	.28	134.	.84	92
93	1190	52493E 00	50075E 00	10257E 01	.024	100.	.11	81.	.83	93
94	1203	50818E 00	86025E 00	1364E 01	.257	0.	.47	10.	.82	94
95	1216	70258E 00	28967E 00	99225E 00	.416	10.	.50	25.	.81	95
96	1229	48514E 00	58025E 00	10554E 01	.089	332.	.26	162.	.80	96
97	1242	71696E 00	64279E 00	13597E 01	.055	282.	.29	78.	.79	97
98	1254	70982E 00	75246E 00	15033E 01	.055	304.	.47	99.	.78	98
99	1267	68580E 00	11981E 01	18399E 01	.272	309.	.12	125.	.77	99
100	1280	63627E 00	81359E 00	14499E 01	.122	43.	.33	52.	.76	100
101	1293	10591E 01	75498E 00	1841E 01	.168	60.	.39	40.	.75	101
102	1306	42269E 00	51782E 00	94051E 00	.101	49.	.34	46.	.74	102
103	1318	68600E 00	74977E 00	14358E 01	.044	347.	.30	1.	.73	103

104	1.331	.11284E 01	.83360E 00	.19680E 01	.147	290.	.41	117.	105
105	1.344	.81619E 00	.45536E 00	.12716E 01	.284	322.	.33	145.	106
106	1.357	.61135E 00	.57779E 00	.11891E 01	.028	26.	.23	72.	107
107	1.370	.64940E 00	.11035E 01	.17529E 01	.259	351.	.36	167.	108
108	1.382	.70127E 00	.62746E 00	.13287E 01	.056	8.	.53	10.	109
109	1.395	.30689E 00	.82479E 00	.11317E 01	.458	81.	.48	72.	110
110	1.408	.62235E 00	.75384E 00	.13762E 01	.096	304.	.32	112.	111
111	1.421	.12061E 01	.43199E 00	.16380E 01	.473	11.	.16	178.	112
112	1.434	.42833E 00	.45515E 00	.88347E 00	.030	158.	.15	153.	113
113	1.446	.49184E 00	.52010E 00	.10119E 01	.028	357.	.16	43.	114
114	1.459	.44225E 00	.68383E 00	.10163E 01	.130	302.	.27	87.	115
115	1.472	.44301E 00	.57404E 00	.11268E 01	.214	79.	.21	109.	116
116	1.485	.85810E 00	.61437E 00	.14725E 01	.166	74.	.11	62.	117
117	1.498	.32880E 00	.47192E 00	.80072E 00	.179	87.	.31	82.	118
118	1.510	.43854E 00	.37465E 00	.81319E 00	.079	49.	.17	58.	119
119	1.523	.76222E 00	.51192E 00	.12741E 01	.196	65.	.66	62.	120
120	1.536	.49431E 00	.93986E 00	.14342E 01	.311	65.	.56	67.	121
121	1.549	.21468E 00	.30866E 00	.52335E 00	.180	20.	.33	27.	122
122	1.562	.75717E 00	.42538E 00	.11826E 01	.281	306.	.12	148.	123
123	1.574	.41178E 00	.80677E 00	.12186E 01	.324	29.	.09	15.	124
124	1.587	.74379E 00	.30848E 00	.10523E 01	.414	31.	.20	26.	125
125	1.600	.52416E 00	.40705E 00	.93121E 00	.126	38.	.62	32.	126
126	1.613	.37186E 00	.4181E 00	.73977E 00	.058	68.	.43	57.	127
127	1.626	.66478E 00	.47810E 00	.11429E 01	.163	57.	.48	60.	128
128	1.638	.48661E 00	.66878E 00	.11554E 01	.158	332.	.56	154.	129
129	1.651	.48490E 00	.72210E 00	.12070E 01	.197	80.	.24	45.	130
130	1.664	.35078E 00	.30774E 00	.68552E 00	.065	94.	.26	82.	131
131	1.677	.36389E 00	.26853E 00	.63242E 00	.151	32.	.38	27.	132
132	1.690	.31032E 00	.32038E 00	.63070E 00	.016	289.	.13	104.	133
133	1.702	.71435E 00	.29484E 00	.10092E 01	.416	328.	.19	135.	134
134	1.715	.79450E 00	.73463E 00	.15291E 01	.039	47.	.69	39.	135
135	1.728	.34674E 00	.33107E 00	.67781E 00	.023	352.	.40	166.	136
136	1.741	.47611E 00	.42501E 00	.90111E 00	.057	289.	.56	102.	137
137	1.754	.13223E 01	.62454E 00	.19469E 01	.358	39.	.35	31.	138
138	1.766	.77626E 00	.17852E 00	.95478E 01	.56	10.	.22	8.	139
139	1.779	.25763E 00	.45999E 00	.71762E 00	.222	111.	.17	110.	140
140	1.792	.43544E 00	.40438E 00	.83982E 00	.037	81.	.03	138.	141
141	1.805	.33538E 00	.35884E 00	.69422E 00	.034	42.	.51	43.	142
142	1.818	.53906E 00	.78272E 00	.13218E 01	.184	78.	.56	59.	143
143	1.830	.35400E 00	.54366E 00	.89767E 00	.211	90.	.51	78.	144
144	1.843	.56023E 00	.67419E 00	.12344E 01	.092	33.	.51	31.	145
145	1.856	.45580E 00	.42100E 00	.87680E 00	.040	325.	.45	141.	146
146	1.869	.46474E 00	.22762E 00	.69236E 00	.342	54.	.40	26.	147
147	1.882	.20923E 00	.28217E 00	.49140E 00	.148	3.	.34	180.	148
148	1.894	.34091E 00	.36715E 00	.70806E 00	.037	68.	.29	65.	149
149	1.907	.61195E 00	.41656E 00	.10285E 01	.190	32.	.73	46.	150
150	1.920	.44483E 00	.27525E 00	.72008E 00	.236	86.	.35	59.	151
151	1.933	.36998E 00	.31627E 00	.68624E 00	.078	91.	.34	132.	152
152	1.946	.49277E 00	.27469E 00	.76746E 00	.284	295.	.61	116.	153
153	1.958	.48336E 00	.37277E 00	.85613E 00	.129	299.	.12	63.	154
154	1.971	.25150E 00	.21657E 00	.46807E 00	.075	120.	.18	52.	155
155	1.984	.37838E 00	.23924E 00	.61762E 00	.225	100.	.28	91.	156
156	1.997	.43480E 00	.47917E 00	.91397E 00	.049	316.	.47	155.	157
157	2.010	.50615E 00	.39586E 00	.90201E 00	.122	65.	.55	75.	158
158	2.022	.25478E 00	.32800E 00	.58278E 00	.126	102.	.57	97.	159
159	2.035	.57231E 00	.44556E 00	.10178E 01	.124	58.	.46	48.	160
160	2.048	.51953E 00	.20457E 00	.72410E 01	.435	54.	.44	63.	161
161	2.061	.20974E 00	.35872E 00	.56846E 00	.262	10.	.27	18.	162
162	2.074	.48104E 00	.35939E 00	.84043E 00	.145	77.	.30	56.	163
163	2.086	.31843E 00	.47992E 00	.79835E 00	.202	93.	.38	100.	

164	2.099	.47088E 00	.32493E 00	.79580E 00	.183	57.	.07	74.	.48	164
165	2.112	.26309E 00	.31866E 00	.58176E 00	.096	358.	.35	169.	.47	165
166	2.125	.23652E 00	.19470E 00	.43121E 00	.097	16.	.15	163.	.47	166
167	2.138	.33552E 00	.54085E 00	.87637E 00	.234	86.	.59	178.	.47	167
168	2.150	.31982E 00	.51963E 00	.83945E 00	.238	354.	.51	18.	.47	168
169	2.163	.22938E 00	.30807E 00	.53744E 00	.146	288.	.23	124.	.46	169
170	2.176	.29786E 00	.51069E 00	.80855E 00	.263	94.	.19	85.	.46	170
171	2.189	.18398E 00	.30229E 00	.48627E 00	.255	46.	.43	50.	.46	171
172	2.202	.59329E 00	.28217E 00	.87545E 00	.355	8.	.68	18.	.45	172
173	2.214	.23293E 00	.30988E 00	.54280E 00	.142	35.	.19	46.	.45	173
174	2.227	.33457E 00	.21706E 00	.85163E 00	.213	86.	.19	105.	.45	174
175	2.240	.39138E 00	.55173E 00	.94310E 00	.170	60.	.46	41.	.45	175
176	2.253	.27550E 00	.69580E 00	.97130E 00	.333	61.	.64	52.	.44	176
177	2.266	.19736E 00	.39264E 00	.59000E 00	.331	118.	.11	116.	.44	177
178	2.278	.16087E 00	.19077E 00	.35163E 00	.085	78.	.25	92.	.44	178
179	2.291	.41708E 00	.20978E 00	.62685E 00	.331	75.	.42	80.	.44	179
180	2.304	.22049E 00	.57770E 00	.79819E 00	.448	78.	.38	51.	.43	180
181	2.317	.35924E 00	.33253E 00	.69177E 00	.039	86.	.09	72.	.43	181
182	2.330	.33421E 00	.35052E 00	.88473E 00	.024	83.	.33	70.	.43	182
183	2.342	.37213E 00	.49073E 00	.86286E 00	.137	87.	.36	82.	.43	183
184	2.355	.35685E 00	.22912E 00	.58597E 00	.218	83.	.32	81.	.42	184
185	2.368	.27124E 00	.24936E 00	.52061E 00	.042	309.	.01	125.	.42	185
186	2.381	.22857E 00	.33947E 00	.56804E 00	.195	345.	.36	7.	.42	186
187	2.394	.27506E 00	.18555E 00	.46060E 00	.194	107.	.09	130.	.42	187
188	2.406	.47161E 00	.22534E 00	.69695E 00	.353	49.	.65	61.	.42	188
189	2.419	.17384E 00	.13172E 00	.30556E 00	.138	86.	.23	68.	.41	189
190	2.432	.23434E 00	.23445E 00	.45930E 00	.001	47.	.19	31.	.41	190
191	2.445	.19774E 00	.12803E 00	.32577E 00	.214	108.	.30	105.	.41	191
192	2.458	.49251E 00	.41636E 00	.90887E 00	.084	359.	.35	19.	.41	192
193	2.470	.26935E 00	.24261E 00	.51196E 00	.052	54.	.51	34.	.40	193
194	2.483	.19635E 00	.53248E 00	.72883E 00	.461	284.	.30	94.	.40	194
195	2.496	.18786E 00	.26955E 00	.45741E 00	.179	113.	.19	127.	.40	195
196	2.509	.13495E 00	.38065E 00	.51560E 00	.477	51.	.27	35.	.40	196
197	2.522	.18948E 00	.37589E 00	.54557E 00	.329	53.	.45	47.	.40	197
198	2.534	.13312E 00	.30579E 00	.43891E 00	.393	115.	.33	119.	.39	198
199	2.547	.32899E 00	.27457E 00	.60356E 00	.090	94.	.42	118.	.39	199
200	2.560	.29279E 00	.37826E 00	.67105E 00	.127	82.	.29	86.	.39	200
201	2.573	.18337E 00	.25502E 00	.43889E 00	.162	97.	.12	90.	.39	201
202	2.586	.25249E 00	.24399E 00	.49649E 00	.017	37.	.25	26.	.39	202
203	2.598	.17370E 00	.28239E 00	.45609E 00	.238	47.	.46	51.	.38	203
204	2.611	.20863E 00	.47661E 00	.68534E 00	.391	74.	.41	56.	.38	204
205	2.624	.36852E 00	.17984E 00	.54835E 00	.344	31.	.31	62.	.38	205
206	2.637	.17201E 00	.16705E 00	.33906E 00	.015	93.	.10	52.	.38	206
207	2.650	.34409E 00	.32533E 00	.67669E 00	.017	301.	.50	104.	.38	207
208	2.662	.53350E 00	.14128E 00	.67478E 00	.581	66.	.30	64.	.38	208
209	2.675	.28349E 00	.21566E 00	.49914E 00	.136	347.	.24	151.	.37	209
210	2.688	.16914E 00	.16502E 00	.33816E 00	.000	61.	.44	69.	.37	210
211	2.701	.38042E 00	.23633E 00	.61305E 00	.241	108.	.28	85.	.37	211
212	2.714	.13906E 00	.24458E 00	.38364E 00	.275	303.	.28	103.	.37	212
213	2.726	.26071E 00	.19023E 00	.45035E 00	.156	62.	.26	93.	.37	213
214	2.739	.25746E 00	.18907E 00	.44639E 00	.153	300.	.25	111.	.37	214
215	2.752	.10372E 00	.71030E-01	.47475E 00	.187	360.	.11	4.	.36	215
216	2.765	.26736E 00	.33344E 00	.60131E 00	.111	73.	.76	75.	.36	216
217	2.778	.20696E 00	.16237E 00	.37232E 00	.112	21.	.09	153.	.36	217
218	2.790	.10162E 00	.25568E 00	.35730E 00	.431	79.	.22	90.	.36	218
219	2.803	.20643E 00	.24628E 00	.45271E 00	.088	30.	.31	19.	.36	219
220	2.816	.33276E 00	.19394E 00	.52570E 00	.266	331.	.61	159.	.36	220
221	2.829	.20097E 00	.39185E 00	.59282E 00	.322	358.	.46	12.	.35	221
222	2.842	.56321E-01	.16109E 00	.21741E 00	.482	67.	.41	61.	.35	222
223	2.854	.17003E 00	.34654E 00	.51658E 00	.342	23.	.48	22.	.35	223

224	2.867	11216E	00	91744E-01	20391E	00	100	16.	18	10.	35	224
225	2.880	22424E	00	14831E	00	00	204	88.	24	91.	35	225
226	2.893	18892E	00	12249E	00	00	213	95.	39	98.	35	226
227	2.906	13418E	00	19175E	00	00	177	61.	68	62.	34	227
228	2.918	11681E	00	24103E	00	00	347	30.	37	30.	34	228
229	2.931	17498E	00	75744E-01	25072E	00	396	28.	45	9.	34	229
230	2.944	16588E	00	22010E	00	00	140	21.	21	57.	34	230
231	2.957	17940E	00	16142E	00	00	053	55.	31	48.	34	231
232	2.970	17280E	00	17200E	00	00	002	57.	63	63.	34	232
233	2.982	22762E	00	29384E	00	00	127	81.	65	74.	34	233
234	2.995	19613E	00	22744E	00	00	074	91.	47	63.	33	234
235	3.008	22452E	00	29741E	00	00	140	74.	63	71.	33	235
236	3.021	20901E	00	14622E	00	00	177	67.	57	68.	33	236
237	3.034	18220E	00	17076E	00	00	032	61.	56	80.	33	237
238	3.046	10363E	00	24573E	00	00	407	3.	12	96.	33	238
239	3.059	23028E	00	11371E	00	00	339	26.	44	21.	33	239
240	3.072	97094E-01	00	83843E-01	1854E	00	073	39.	46	43.	33	240
241	3.085	20049E	00	29716E	00	00	178	312.	48	139.	32	241
242	3.098	38539E	00	19410E	00	00	330	38.	29	153.	32	242
243	3.110	20348E	00	19377E	00	00	009	51.	46	43.	32	243
244	3.123	16118E	00	10409E	00	00	215	45.	42	43.	32	244
245	3.136	20779E	00	79814E-01	28760E	00	445	324.	14	153.	32	245
246	3.149	40659E	00	15399E	00	00	451	333.	29	166.	32	246
247	3.162	27744E	00	22489E	00	00	105	343.	42	148.	32	247
248	3.174	20632E	00	10853E	00	00	160	17.	34	25.	32	248
249	3.187	22789E	00	21751E	00	00	355	13.	55	7.	31	249
250	3.200	37205E	00	21751E	00	00	262	34.	25	38.	31	250
251	3.213	17174E	00	11210E	00	00	210	35.	37	20.	31	251
252	3.226	14416E	00	28956E	00	00	335	311.	56	131.	31	252
253	3.238	33589E	00	16246E	00	00	348	55.	29	33.	31	253
254	3.251	17377E	00	10896E	00	00	229	31.	35	9.	31	254
255	3.264	22170E	00	37765E	00	00	260	99.	61	76.	31	255
256	3.277	26341E	00	28902E	00	00	046	42.	12	120.	31	256
257	3.290	37027E	00	18629E	00	00	331	15.	12	40.	30	257
258	3.302	28437E	00	15921E	00	00	282	79.	49	64.	30	258
259	3.315	43396E	00	11715E	00	00	575	340.	21	137.	30	259
260	3.328	11645E	00	29737E	00	00	437	82.	33	87.	30	260
261	3.341	15651E	00	24664E	00	00	224	93.	68	99.	30	261
262	3.354	11722E	00	22462E	00	00	314	124.	60	142.	30	262
263	3.366	14077E	00	30394E	00	00	367	72.	01	120.	30	263
264	3.379	27560E	00	13943E	00	00	328	315.	06	82.	29	264
265	3.392	18409E	00	11290E	00	00	240	352.	19	151.	29	265
266	3.405	40589E	00	20343E	00	00	328	74.	70	75.	29	266
267	3.418	12519E	00	21600E	00	00	266	18.	51	9.	29	267
268	3.430	35435E	00	20551E	00	00	266	41.	39	50.	29	268
269	3.443	20419E	00	52451E	00	00	440	42.	20	18.	29	269
270	3.456	25311E	00	21093E	00	00	091	316.	33	127.	29	270
271	3.469	27991E	00	14350E	00	00	322	313.	07	5.	29	271
272	3.482	60936E-01	00	13571E	00	00	380	62.	32	46.	29	272
273	3.494	14033E	00	98894E-01	23923E	00	173	62.	43	55.	29	273
274	3.507	38184E	00	10895E	00	00	556	331.	22	133.	29	274
275	3.520	20973E	00	30079E	00	00	178	51.	28	42.	28	275
276	3.533	30434E	00	15045E	00	00	338	14.	27	15.	28	276
277	3.546	15744E	00	15667E	00	00	006	36.	57	39.	28	277
278	3.558	86784E-01	00	30170E	00	00	553	88.	43	79.	28	278
279	3.571	13283E	00	22276E	00	00	253	75.	50	59.	28	279
280	3.584	21174E	00	14435E	00	00	189	72.	70	77.	28	280
281	3.597	27199E	00	22834E	00	00	092	63.	62	57.	28	281
282	3.610	89388E-01	00	13580E	00	00	206	33.	50	16.	28	282
283	3.622	11862E	00	15050E	00	00	118	85.	16	60.	28	283

284	3.635	.13317E 00	.13/37E 00	.27054E 00	.016	280.	.26	100.	284
285	3.648	.12104E 00	.25602E 00	.37906E 00	.361	89.	.10	40.	285
286	3.661	.15818E 00	.10486E 00	.26305E 00	.203	29.	.48	47.	286
287	3.674	.77932E-01	.10557E 00	.18350E 00	.151	114.	.25	123.	287
288	3.686	.16239E 00	.98455E-01	.26084E 00	.245	74.	.17	86.	288
289	3.699	.65494E-01	.11602E 00	.18152E 00	.278	4.	.16	6.	289
290	3.712	.12905E 00	.13449E 00	.28354E 00	.021	285.	.49	78.	290
291	3.725	.11445E 00	.11225E 00	.22670E 00	.010	86.	.65	90.	291
292	3.738	.16676E 00	.21336E 00	.38012E 00	.123	73.	.27	84.	292
293	3.750	.16274E 00	.16060E 00	.32333E 00	.007	55.	.55	64.	293
294	3.763	.11266E 00	.16799E 00	.28246E 00	.202	323.	.40	137.	294
295	3.776	.15575E 00	.11011E 00	.26586E 00	.172	64.	.67.	67.	295
296	3.789	.24179E 00	.17862E 00	.42042E 00	.150	294.	.51	82.	296
297	3.802	.18134E 00	.69720E-01	.25106E 00	.445	99.	.30	92.	297
298	3.814	.12501E 00	.15812E 00	.28313E 00	.117	116.	.40	131.	298
299	3.827	.15431E 00	.11700E 00	.27131E 00	.138	38.	.26	63.	299
300	3.840	.10728E 00	.5017E-01	.15779E 00	.360	327.	.51	149.	300
301	3.853	.17390E 00	.68916E-01	.24282E 00	.432	30.	.52	29.	301
302	3.866	.21963E 00	.86408E-01	.30604E 00	.435	63.	.69.	69.	302
303	3.878	.88626E-01	.19304E 00	.28167E 00	.371	22.	.53	31.	303
304	3.891	.31884E 00	.12204E 00	.44088E 00	.446	77.	.51	85.	304
305	3.904	.45306E-01	.15318E 00	.19849E 00	.543	337.	.48	161.	305
306	3.917	.78876E-01	.13070E 00	.20957E 00	.247	63.	.58	59.	306
307	3.930	.18245E 00	.21338E 00	.39583E 00	.078	325.	.29	139.	307
308	3.942	.17434E 00	.10528E 00	.28262E 00	.234	319.	.39	139.	308
309	3.955	.12876E 00	.11107E 00	.23983E 00	.074	338.	.19	138.	309
310	3.968	.11312E 00	.96685E-01	.20981E 00	.078	12.	.40	7.	310
311	3.981	.78769E-01	.20383E 00	.2880E 00	.454	35.	.58	57.	311
312	3.994	.67039E-01	.21365E 00	.28069E 00	.522	28.	.66	32.	312
313	4.006	.21186E 00	.21770E 00	.42956E 00	.014	74.	.54	72.	313
314	4.019	.16129E 00	.23354E 00	.4003E 00	.195	51.	.34	30.	314
315	4.032	.10752E 00	.79263E-01	.18678E 00	.151	31.	.72	37.	315
316	4.045	.91681E-01	.71266E-01	.1625E 00	.125	12.	.28	37.	316
317	4.058	.10310E 00	.16594E 00	.26903E 00	.234	89.	.40	35.	317
318	4.070	.1947E 00	.9321E-01	.28775E 00	.352	84.	.22	103.	318
319	4.083	.98512E-01	.50288E-01	.14950E 00	.318	47.	.64	46.	319
320	4.096	.17951E 00	.11333E 00	.29345E 00	.223	104.	.20	100.	320
321	4.109	.20847E 00	.75646E-01	.28411E 00	.467	68.	.47	78.	321
322	4.122	.13333E 00	.10388E 00	.29721E 00	.301	179.	.41	179.	322
323	4.134	.96625E-01	.89926E-01	.18655E 00	.036	69.	.50	64.	323
324	4.147	.16087E 00	.13145E 00	.29272E 00	.099	12.	.8.	8.	324
325	4.160	.15703E 00	.17807E 00	.33510E 00	.063	300.	.66	176.	325
326	4.173	.23767E 00	.25099E 00	.48836E 00	.027	101.	.28	123.	326
327	4.186	.69893E-01	.25767E 00	.32757E 00	.573	237.	.34	102.	327
328	4.198	.27319E 00	.11233E 00	.38582E 00	.416	40.	.66	46.	328
329	4.211	.74428E-01	.14823E 00	.22266E 00	.331	344.	.15	131.	329
330	4.224	.15237E 00	.12456E 00	.27693E 00	.100	354.	.30	31.	330
331	4.237	.85140E-01	.98341E-01	.18348E 00	.072	97.	.23	101.	331
332	4.250	.16608E 00	.12511E 00	.29112E 00	.141	90.	.21	87.	332
333	4.262	.17678E 00	.12701E 00	.30379E 00	.164	63.	.16	90.	333
334	4.275	.1386E 00	.12555E 00	.26394E 00	.048	351.	.23	62.	334
335	4.288	.18640E 00	.73293E-01	.25970E 00	.436	51.	.55	62.	335
336	4.301	.66371E-01	.11405E 00	.18042E 00	.264	25.	.28	40.	336
337	4.314	.11797E 00	.71940E-01	.18991E 00	.242	11.	.68	8.	337
338	4.326	.13678E 00	.13343E 00	.27021E 00	.012	82.	.40	77.	338
339	4.339	.77347E-01	.86630E-01	.16402E 00	.056	98.	.17	44.	339
340	4.352	.11361E 00	.76195E-01	.18980E 00	.197	346.	.47	175.	340
341	4.365	.58686E-01	.95095E-01	.15378E 00	.237	339.	.33	149.	341
342	4.378	.23291E 00	.13217E 00	.36507E 00	.276	66.	.61	72.	342
343	4.390	.82660E-01	.13820E 00	.22089E 00	.251	32.	.54	12.	343

TW9-SIDED SPECTRUM

21:59 APR 28, 1977

A1 = 5923856.25 EAST START 760220 190028 ST9P 760321 20701 SAMPLING RATE 56.25 SECONDS
 A2 = 5923856.25 NORTH START 760220 190028 ST9P 760321 20701 SAMPLING RATE 56.25 SECONDS

SPECTRUM OF SERIES WITH 4500C POINTS DIVIDED INTO 9 PIECES WITH 5000 POINTS IN EACH PIECE.
 2500 ESTIMATES AVERAGED OVER 1 ADJACENT FREQUENCY HANDS TO GIVE 2500 AVERAGED ESTIMATES.

SPECTRUM UNITS: (MM/S)
 UNITS OF TIME (T.U.) ARE HOURS
 ORIENTATIONS ARE CLOCKWISE FROM NORTH

ESTIMATE NUMBER	FREQUENCY CYCLES/T.U.	CLOCKWISE SPECTRUM	ANTI-CLOCKWISE SPECTRUM	TOTAL SPECTRUM	ROTARY COEFFICIENT	ELLIPSE ORIENTATION	ELLIPSE STABILITY	MEAN ORIENTATION	PERIOD T.U./CYCLE	ESTIMATE NUMBER
0	.000	.17593E-10	.17593E-10	.17593E-10	.000	57.	.80	56.	.00	0
1	.013	.94566E 03	.13964E 04	.23621E 04	.182	34.	.86	39.	78.13	1
2	.026	.19519E 03	.20454E 03	.39973E 03	.023	96.	.18	94.	39.06	2
3	.038	.46254E 03	.33868E 03	.80122E 03	.155	15.	.67	23.	26.04	3
4	.051	.71898E 02	.63966E 02	.13586E 03	.058	38.	.05	14.	19.53	4
5	.064	.54293E 02	.93613E 02	.14791E 03	.266	9.	.63	13.	15.63	5
6	.077	.35631E 03	.30292E 03	.65922E 03	.081	24.	.46	4.	13.02	6
7	.090	.24368E 03	.11290E 03	.35658E 03	.367	320.	.25	100.	9.77	7
8	.102	.14749E 03	.32421E 02	.17991E 03	.640	71.	.15	13.	8.68	8
9	.115	.49883E 02	.22545E 02	.72428E 02	.377	83.	.18	67.	7.81	9
10	.128	.42596E 02	.18923E 02	.61520E 02	.385	61.	.36	63.	7.10	10
11	.141	.46023E 02	.37906E 02	.83929E 02	.097	307.	.07	98.	6.51	11
12	.154	.57225E 02	.28822E 02	.96047E 02	.192	328.	.15	149.	6.01	12
13	.166	.26642E 02	.27852E 02	.54515E 02	.022	358.	.36	6.	5.58	13
14	.179	.52528E 02	.12998E 02	.65536E 02	.603	77.	.35	62.	5.21	14
15	.192	.21066E 02	.10206E 02	.31272E 02	.347	28.	.36	21.	4.50	15
16	.205	.10256E 02	.15641E 02	.25897E 02	.208	34.	.30	29.	4.34	16
17	.218	.18154E 02	.17300E 02	.35454E 02	.024	20.	.05	127.	4.11	17
18	.230	.14174E 02	.12112E 02	.26286E 02	.078	47.	.20	71.	3.91	18
19	.243	.21235E 02	.10661E 02	.31896E 02	.332	30.	.43	36.	3.72	19
20	.256	.89937E 01	.64263E 01	.15426E 02	.167	3.	.29	163.	3.55	20
21	.269	.96553E 01	.10639E 02	.20294E 02	.048	22.	.31	42.	3.40	21
22	.282	.13444E 02	.89522E 01	.23396E 02	.201	297.	.25	90.	3.26	22
23	.294	.57242E 01	.42332E 01	.13540E 02	.375	300.	.08	99.	3.13	23
24	.307	.87134E 01	.11472E 02	.17199E 02	.334	11.	.65	54.	3.00	24
25	.320	.55916E 01	.87440E 01	.17457E 02	.002	52.	.24	15.	2.89	25
26	.333	.86871E 01	.62379E 01	.11830E 02	.055	15.	.13	15.	2.79	26
27	.346	.82931E 01	.21438E 01	.12619E 02	.604	301.	.17	95.	2.60	27
28	.358	.11959E 02	.43211E 01	.18061E 02	.315	94.	.13	117.	2.44	28
29	.371	.10270E 02	.61018E 01	.19280E 02	.324	34.	.50	42.	2.37	29
30	.384	.41734E 01	.90098E 01	.70567E 01	.065	64.	.52	71.	2.30	30
31	.397	.53798E 01	.28833E 01	.12619E 02	.183	45.	.26	41.	2.23	31
32	.410	.28937E 01	.63324E 01	.11712E 02	.081	3.	.62	170.	2.17	32
33	.422	.76924E 01	.44855E 01	.73822E 01	.216	349.	.29	6.	2.11	33
34	.435	.43242E 01	.44691E 01	.12162E 02	.265	25.	.31	44.	2.06	34
35	.448	.37444E 01	.37539E 01	.80821E 01	.071	51.	.39	40.	2.00	35
36	.461	.56379E 01	.23579E 01	.61023E 01	.227	8.	.30	12.	1.95	36
37	.474	.39724E 01	.19664E 01	.74043E 01	.483	35.	.26	50.	1.86	37
38	.486	.24322E 01	.30822E 01	.70545E 01	.126	48.	.21	47.	1.82	38
39	.499	.27140E 01	.24116E 01	.48499E 01	.055	48.	.37	44.		39
40	.512	.30036E 01	.21116E 01	.48276E 01	.125	58.	.77	60.		40
41	.525	.59136E 01	.28861E 01	.58917E 01	.030	53.	.31	53.		41
42	.538	.35420E 01	.26044E 01	.85240E 01	.389	3.	.41	6.		42
43	.550		.22331E 01	.58151E 01	.232	27.	.12	59.		43

44	562	2665E 01	29/83E 01	56448E 01	055	16	44	13	178	44
45	576	3393E 01	3295E 01	66857E 01	014	360	18	36	174	45
46	589	23742E 01	16201E 01	39944E 01	189	94	39	97	170	46
47	602	20395E 01	26362E 01	46762E 01	128	347	26	173	166	47
48	614	16872E 01	15225E 01	32097E 01	051	13	66	23	163	48
49	627	24202E 01	22612E 01	46814E 01	034	42	52	34	159	49
50	640	14023E 01	27929E 01	41952E 01	331	79	31	58	156	50
51	653	19633E 01	13985E 01	33639E 01	168	101	34	113	153	51
52	666	31260E 01	12017E 01	43277E 01	445	43	65	47	150	52
53	678	13587E 01	16253E 01	31840E 01	147	19	60	24	147	53
54	691	20823E 01	21142E 01	41965E 01	008	359	24	19	145	54
55	704	77016E 00	14885E 01	22587E 01	318	39	36	39	142	55
56	717	26211E 01	11064E 01	37295E 01	407	73	51	63	140	56
57	730	13383E 01	18008E 01	31391E 01	147	71	46	70	137	57
58	742	21012E 01	16336E 01	37948E 01	107	83	47	72	135	58
59	755	19918E 01	96561E 00	29574E 01	347	47	29	57	132	59
60	768	18604E 01	12267E 01	30872E 01	205	55	09	58	130	60
61	781	12553E 01	11447E 01	24000E 01	046	102	12	95	128	61
62	794	10153E 01	10521E 01	20674E 01	018	352	19	172	126	62
63	806	80527E 00	20150E 01	28203E 01	429	9	30	176	124	63
64	819	53203E 00	85253E 00	13846E 01	231	33	12	21	122	64
65	832	18539E 01	11789E 01	30328E 01	223	76	11	52	120	65
66	845	98348E 00	12240E 01	22075E 01	109	325	40	145	118	66
67	858	24661E 01	18404E 01	43065E 01	145	66	45	70	117	67
68	870	13237E 01	18548E 01	31785E 01	167	43	19	26	115	68
69	883	17089E 01	15332E 01	32420E 01	054	43	22	54	113	69
70	896	94448E 00	12156E 01	21601E 01	126	47	45	54	112	70
71	909	84562E 00	10561E 01	19017E 01	111	60	22	72	110	71
72	922	99005E 00	97247E 00	19625E 01	009	347	13	180	109	72
73	934	14030E 01	84562E 00	22486E 01	248	17	04	3	107	73
74	947	18610E 01	97613E 00	28371E 01	312	30	66	42	106	74
75	960	15687E 01	93669E 00	25054E 01	222	356	24	159	104	75
76	973	15694E 01	83833E 00	24077E 01	304	68	32	57	103	76
77	986	53136E 00	10860E 01	16173E 01	343	48	34	49	101	77
78	998	72374E 00	99186E 00	17156E 01	156	19	46	19	100	78
79	1011	66387E 00	10406E 01	14965E 01	351	306	37	122	99	79
80	1024	10476E 01	61973E 00	19345E 01	314	50	11	88	96	80
81	1037	87211E 00	29592E 00	16673E 01	257	78	37	61	96	81
82	1050	12732E 01	66413E 00	20373E 01	493	5	28	167	95	82
83	1062	78710E 00	60475E 00	44373E 01	095	34	21	42	94	83
84	1075	41896E 00	47311E 00	82207E 00	061	38	14	61	92	84
85	1088	10293E 01	68759E 00	17169E 01	199	16	31	3	91	85
86	1101	84302E 00	60475E 00	14478E 01	165	328	12	8	90	86
87	1114	83431E 00	58771E 00	4220E 01	173	36	33	24	89	87
88	1126	65280E 00	68870E 00	13415E 01	027	287	20	24	88	88
89	1139	10530E 01	91619E 00	1892E 01	069	26	48	28	87	89
90	1152	10038E 01	68526E 00	16891E 01	189	342	18	167	86	90
91	1165	90816E 00	48762E 00	13958E 01	301	28	53	29	85	91
92	1178	10647E 01	10076E 01	20723E 01	028	83	36	29	84	92
93	1190	55340E 00	47816E 00	10316E 01	073	30	50	32	83	93
94	1203	46559E 00	66825E 00	11338E 01	179	326	39	157	82	94
95	1216	53743E 00	53078E 00	10684E 01	006	12	56	17	81	95
96	1229	11681E 01	35217E 00	15203E 01	537	31	34	29	81	96
97	1242	68943E 00	54906E 00	12387E 01	113	349	24	12	80	97
98	1254	79651E 00	54915E 00	13457E 01	184	348	35	155	79	98
99	1267	37044E 00	51179E 00	8224E 00	160	82	45	66	78	99
100	1280	84871E 00	44888E 00	12976E 01	308	27	54	35	77	100
101	1293	45846E 00	61053E 00	10692E 01	142	63	16	41	77	101
102	1306	72702E 00	41215E 00	11392E 01	276	24	49	22	76	102
103	1318									103

104	1.331	.51272E 00	.74583E 00	.12585E 01	--185	34.	.19	21.	.75	104
105	1.344	.51442E 00	.40421E 00	.91883E 00	.120	27.	.37	42.	.74	105
106	1.357	.75942E 00	.61608E 00	.13755E 01	.104	85.	.17	68.	.74	106
107	1.370	.51444E 00	.69703E 00	.12117E 01	--151	88.	.45	53.	.73	107
108	1.382	.90331E 00	.56565E 00	.14690E 01	.230	46.	.29	53.	.72	108
109	1.395	.30322E 00	.61440E 00	.92412E 00	--331	341.	.22	159.	.72	109
110	1.408	.67751E 00	.35390E 00	.10314E 01	.314	56.	.49	62.	.71	110
111	1.421	.33035E 00	.57275E 00	.90360E 00	--268	321.	.27	134.	.70	111
112	1.434	.43647E 00	.34124E 00	.77771E 00	.122	49.	.17	40.	.70	112
113	1.446	.49064E 00	.55072E 00	.10414E 01	--058	27.	.31	13.	.69	113
114	1.459	.67801E 00	.46077E 00	.11388E 01	.191	46.	.53	60.	.68	114
115	1.472	.44217E 00	.16259E 00	.60516E 00	.461	71.	.08	31.	.68	115
116	1.485	.99210E 00	.42124E 00	.14193E 01	.398	359.	.20	150.	.67	116
117	1.498	.37132E 00	.57709E 00	.14841E 00	--217	57.	.44	62.	.67	117
118	1.510	.41515E 00	.67314E 00	.10883E 01	--237	49.	.45	59.	.66	118
119	1.523	.61632E 00	.28865E 00	.10497E 00	.362	8.	.56	13.	.66	119
120	1.536	.68242E 00	.51155E 00	.11940E 01	.143	63.	.10	87.	.65	120
121	1.549	.45205E 00	.28815E 00	.10740E 00	.221	107.	.19	127.	.65	121
122	1.562	.46008E 00	.47946E 00	.93954E 00	.021	133.	.38	148.	.64	122
123	1.574	.72165E 00	.72865E 00	.14503E 01	--005	29.	.30	36.	.64	123
124	1.587	.28003E 00	.38778E 00	.66780E 00	--161	62.	.30	49.	.63	124
125	1.600	.46774E 00	.36347E 00	.83721E 00	.117	337.	.17	14.	.63	125
126	1.613	.36882E 00	.29513E 00	.66395E 00	.111	12.	.51	18.	.62	126
127	1.626	.30983E 00	.34697E 00	.65680E 00	--057	82.	.44	52.	.62	127
128	1.638	.52454E 00	.28418E 00	.80872E 00	.297	39.	.40	33.	.61	128
129	1.651	.33901E 00	.47657E 00	.81558E 00	--169	328.	.06	172.	.61	129
130	1.664	.45157E 00	.46732E 00	.91889E 00	--017	90.	.34	92.	.60	130
131	1.677	.44797E 00	.42518E 00	.87315E 00	.026	343.	.27	8.	.60	131
132	1.690	.25586E 00	.24272E 00	.49858E 00	.026	353.	.15	16.	.59	132
133	1.702	.35581E 00	.35346E 00	.70928E 00	.003	14.	.46	20.	.59	133
134	1.715	.24242E 00	.64545E 00	.88787E 00	--454	326.	.35	154.	.58	134
135	1.728	.35941E 00	.82106E 00	.11805E 01	--391	301.	.34	124.	.58	135
136	1.741	.31255E 00	.31666E 00	.62921E 00	--007	66.	.27	63.	.57	136
137	1.754	.38865E 00	.28719E 00	.67584E 00	.150	109.	.23	170.	.57	137
138	1.766	.89349E 00	.39819E 00	.12817E 01	.379	15.	.11	78.	.57	138
139	1.779	.31101E 00	.23117E 00	.54218E 00	.147	88.	.20	52.	.56	139
140	1.792	.34078E 00	.36748E 00	.70825E 00	--038	40.	.61	38.	.56	140
141	1.805	.47130E 00	.49126E 00	.96256E 00	--021	16.	.18	19.	.55	141
142	1.818	.40845E 00	.27818E 00	.68663E 00	.190	96.	.11	112.	.55	142
143	1.830	.37306E 00	.34252E 00	.71558E 00	.043	319.	.16	127.	.55	143
144	1.843	.49683E 00	.32589E 00	.82672E 00	--043	46.	.62	50.	.54	144
145	1.856	.23950E 00	.30246E 00	.54196E 00	--116	19.	.31	21.	.54	145
146	1.869	.26257E 00	.25430E 00	.51687E 00	.016	18.	.64	21.	.54	146
147	1.882	.33728E 00	.27404E 00	.61133E 00	.103	22.	.30	13.	.53	147
148	1.894	.37185E 00	.30373E 00	.67558E 00	.101	57.	.38	67.	.53	148
149	1.907	.16094E 00	.31277E 00	.47371E 00	--321	50.	.55	57.	.52	149
150	1.920	.20821E 00	.58090E 00	.78911E 00	--472	86.	.31	73.	.52	150
151	1.933	.43651E 00	.20308E 00	.63960E 00	.365	41.	.21	46.	.52	151
152	1.946	.26742E 00	.17707E 00	.44449E 00	.203	353.	.02	21.	.51	152
153	1.958	.41925E 00	.25316E 00	.67242E 00	.247	13.	.37	32.	.51	153
154	1.971	.26426E 00	.20394E 00	.47419E 00	.115	81.	.19	67.	.51	154
155	1.984	.39997E 00	.33756E 00	.73752E 00	.085	72.	.06	34.	.50	155
156	1.997	.20022E 00	.17714E 00	.37736E 00	.247	60.	.18	75.	.50	156
157	2.010	.47752E 00	.28849E 00	.76600E 00	.061	356.	.17	168.	.50	157
158	2.022	.22411E 00	.25229E 00	.47639E 00	--059	35.	.72	34.	.49	158
159	2.035	.23016E 00	.30270E 00	.53286E 00	--136	330.	.28	163.	.49	159
160	2.048	.13498E 00	.49181E 00	.62679E 00	--569	3.	.50	29.	.49	160
161	2.061	.48955E 00	.26517E 00	.75471E 00	.297	59.	.57	67.	.49	161
162	2.074	.33049E 00	.18561E 00	.56609E 00	.344	75.	.08	52.	.48	162
163	2.086	.23347E 00	.11755E 00	.41102E 00	.428	84.	.37	73.	.48	163

164	2.099	.2592E 00	.342/1E 00	.6012E 00	..139	317.	.33	143.	.48	164
165	2.112	.2950E 00	.23642E 00	.53141E 00	.110	57.	.64	64.	.47	165
166	2.125	.30485E 00	.13742E 00	.44426E 00	.372	338.	.14	176.	.47	166
167	2.134	.23845E 00	.21763E 00	.45659E 00	.047	356.	.50	3.	.47	167
168	2.150	.36087E 00	.14679E 00	.50766E 00	.422	352.	.48	171.	.47	168
169	2.163	.22398E 00	.15887E 00	.38286E 00	.170	58.	.19	62.	.46	169
170	2.176	.27717E 00	.28712E 00	.56429E 00	..018	314.	.07	133.	.46	170
171	2.183	.19608E 00	.23933E 00	.43601E 00	.101	40.	.33	35.	.46	171
172	2.202	.28489E 00	.33053E 00	.61541E 00	.074	74.	.54	35.	.45	172
173	2.214	.23889E 00	.26000E 00	.50483E 00	.054	11.	.40	30.	.45	173
174	2.227	.26505E 00	.96547E-01	.36160E 00	.466	64.	.31	57.	.45	174
175	2.240	.19425E 00	.29835E 00	.43261E 00	..211	17.	.35	172.	.44	175
176	2.253	.11825E 00	.16826E 00	.28451E 00	..169	37.	.27	70.	.44	176
177	2.266	.26069E 00	.16039E 00	.42108E 00	.238	76.	.35	158.	.44	177
178	2.278	.28131E 00	.13874E 00	.42005E 00	.339	313.	.25	158.	.44	178
179	2.291	.83122E-01	.18261E 00	.43176E 00	..374	56.	.22	93.	.43	179
180	2.304	.22506E 00	.20671E 00	.43176E 00	.042	59.	.22	44.	.43	180
181	2.317	.26270E 00	.17053E 00	.43363E 00	.212	340.	.29	143.	.43	181
182	2.330	.36685E 00	.20378E 00	.57064E 00	.286	95.	.47	92.	.43	182
183	2.342	.99283E-01	.42612E 00	.52540E 00	..622	20.	.19	21.	.42	183
184	2.355	.22929E 00	.16196E 00	.39125E 00	.172	95.	.46	107.	.42	184
185	2.368	.24032E 00	.10823E 00	.34855E 00	.379	23.	.35	25.	.42	185
186	2.381	.19712E 00	.19221E 00	.38933E 00	.013	41.	.28	35.	.42	186
187	2.394	.14361E 00	.28393E 00	.42753E 00	..328	300.	.28	128.	.42	187
188	2.406	.32768E 00	.18160E 00	.50928E 00	.287	78.	.33	66.	.42	188
189	2.419	.17095E 00	.12041E 00	.29136E 00	.173	37.	.29	63.	.41	189
190	2.432	.16087E 00	.23170E 00	.39257E 00	..180	8.	.47	8.	.41	190
191	2.445	.31940E 00	.16762E 00	.48701E 00	.312	354.	.20	22.	.41	191
192	2.458	.16978E 00	.21425E 00	.38403E 00	..116	56.	.29	72.	.40	192
193	2.470	.19580E 00	.17253E 00	.36833E 00	.063	61.	.23	59.	.40	193
194	2.483	.16749E 00	.15902E 00	.32652E 00	.026	44.	.32	40.	.40	194
195	2.496	.21193E 00	.14746E 00	.35939E 00	.179	321.	.49	147.	.40	195
196	2.509	.22041E 00	.17086E 00	.39127E 00	.127	83.	.64	73.	.40	196
197	2.522	.24953E 00	.16632E 00	.41585E 00	.200	19.	.45	6.	.40	197
198	2.534	.96916E-01	.20853E 00	.30544E 00	..365	47.	.47	57.	.39	198
199	2.547	.21845E 00	.19359E 00	.41204E 00	.060	300.	.26	77.	.39	199
200	2.560	.14024E 00	.13235E 00	.27259E 00	.029	295.	.20	78.	.39	200
201	2.573	.11522E 00	.95532E-01	.21075E 00	.093	71.	.10	21.	.39	201
202	2.586	.15701E 00	.12525E 00	.28226E 00	.113	341.	.37	168.	.39	202
203	2.598	.18748E 00	.21814E 00	.40562E 00	.076	322.	.30	135.	.38	203
204	2.611	.13198E 00	.20885E 00	.34083E 00	.226	334.	.52	153.	.38	204
205	2.624	.29374E 00	.24144E 00	.53517E 00	.098	336.	.15	6.	.38	205
206	2.637	.29101E 00	.10322E 00	.39424E 00	.476	305.	.19	109.	.38	206
207	2.650	.16724E 00	.20056E 00	.38780E 00	..137	5.	.22	32.	.38	207
208	2.662	.17807E 00	.15225E 00	.33032E 00	.078	9.	.45	177.	.38	208
209	2.675	.12318E 00	.16927E 00	.29245E 00	..158	26.	.23	45.	.37	209
210	2.688	.17609E 00	.12434E 00	.30043E 00	.172	6.	.32	177.	.37	210
211	2.701	.94730E-01	.14074E 00	.23547E 00	..195	72.	.19	104.	.37	211
212	2.714	.16235E 00	.16924E 00	.33159E 00	..021	41.	.38	49.	.37	212
213	2.726	.22800E 00	.14486E 00	.37285E 00	.223	47.	.21	69.	.37	213
214	2.739	.12830E 00	.15958E 00	.28788E 00	..109	90.	.19	114.	.37	214
215	2.752	.11472E 00	.18345E 00	.29817E 00	..230	338.	.35	163.	.36	215
216	2.765	.20564E 00	.11012E 00	.31577E 00	.302	56.	.21	39.	.36	216
217	2.778	.19883E 00	.19704E 00	.39587E 00	.005	93.	.62	91.	.36	217
218	2.790	.60466E-01	.12346E 00	.18393E 00	..342	107.	.41	113.	.36	218
219	2.803	.26011E 00	.14980E 00	.40991E 00	.269	356.	.45	21.	.36	219
220	2.816	.20533E 00	.17950E 00	.38483E 00	.067	302.	.05	28.	.36	220
221	2.829	.15139E 00	.19792E 00	.34931E 00	..133	97.	.28	106.	.35	221
222	2.842	.83454E-01	.22949E 00	.31299E 00	..466	92.	.26	86.	.35	222
223	2.854	.21476E 00	.16081E 00	.37558E 00	.144	51.	.49	44.	.35	223

224	2.867	.14163E 00	.87592E-01	.22923E 00	.66.	.64	62.	.35	224
225	2.880	.12461E 00	.85/81E-01	.21039E 00	49.	.21	44.	.35	225
226	2.893	.11114E 00	.12609E 00	.22723E 00	337.	.46	149.	.35	226
227	2.906	.10519E 00	.10310E 00	.20829E 00	54.	.38	55.	.34	227
228	2.918	.26313E 00	.1/215E 00	.43527E 00	26.	.13	4.	.34	228
229	2.931	.11880E 00	.1/415E 00	.2296E 00	54.	.41	54.	.34	229
230	2.944	.24354E 00	.50/65E-01	.33430E 00	67.	.17	69.	.34	230
231	2.957	.76274E-01	.12078E 00	.19706E 00	35.	.27	72.	.34	231
232	2.970	.17543E 00	.12660E 00	.30243E 00	55.	.27	72.	.34	232
233	2.982	.20668E 00	.73828E-01	.28050E 00	62.	.31	78.	.34	233
234	2.995	.68742E-01	.16489E 00	.23367E 00	90.	.52	90.	.33	234
235	3.008	.14292E 00	.19439E 00	.33731E 00	27.	.35	29.	.33	235
236	3.021	.13678E 00	.16416E 00	.30094E 00	295.	.06	83.	.33	236
237	3.034	.21744E 00	.13337E 00	.35122E 00	343.	.11	147.	.33	237
238	3.046	.22622E 00	.12598E 00	.35320E 00	34.	.31	40.	.33	238
239	3.059	.14653E 00	.15555E 00	.30207E 00	72.	.36	82.	.33	239
240	3.072	.97877E-01	.22240E 00	.32021E 00	328.	.50	179.	.33	240
241	3.085	.14587E 00	.13283E 00	.27869E 00	282.	.07	74.	.32	241
242	3.098	.77648E-01	.18721E 00	.26686E 00	84.	.32	92.	.32	242
243	3.110	.12446E 00	.20871E 00	.33317E 00	1.	.35	167.	.32	243
244	3.123	.22738E 00	.13514E 00	.34551E 00	98.	.40	99.	.32	244
245	3.136	.17923E 00	.19698E 00	.37621E 00	56.	.34	64.	.32	245
246	3.149	.20745E 00	.15525E 00	.35270E 00	55.	.35	35.	.32	246
247	3.162	.19822E 00	.17964E 00	.37796E 00	16.	.34	160.	.32	247
248	3.174	.72198E-01	.17098E 00	.24317E 00	359.	.37	5.	.32	248
249	3.187	.13396E 00	.10823E 00	.23220E 00	86.	.20	95.	.31	249
250	3.200	.13627E 00	.13790E 00	.27417E 00	13.	.13	13.	.31	250
251	3.213	.14040E 00	.15985E 00	.30025E 00	74.	.19	76.	.31	251
252	3.226	.23138E 00	.20191E 00	.43329E 00	353.	.45	168.	.31	252
253	3.238	.14618E 00	.15296E 00	.31914E 00	323.	.28	134.	.31	253
254	3.251	.26966E 00	.11347E 00	.38313E 00	315.	.36	135.	.31	254
255	3.264	.76147E-01	.12204E 00	.19819E 00	12.	.43	9.	.31	255
256	3.277	.32980E 00	.19911E 00	.52892E 00	75.	.16	91.	.31	256
257	3.290	.10690E 00	.14670E 00	.25360E 00	12.	.33	28.	.30	257
258	3.302	.13875E 00	.98967E-01	.23771E 00	105.	.44	84.	.30	258
259	3.315	.15232E 00	.10268E 00	.25500E 00	56.	.19	23.	.30	259
260	3.328	.17743E 00	.16141E 00	.33884E 00	341.	.49	163.	.30	260
261	3.341	.11790E 00	.16215E 00	.28005E 00	335.	.15	154.	.30	261
262	3.354	.11540E 00	.7322E-01	.18865E 00	343.	.45	159.	.30	262
263	3.366	.10006E 00	.10001E 00	.20007E 00	43.	.21	31.	.30	263
264	3.379	.84823E-01	.16259E 00	.24941E 00	314.	.13	123.	.30	264
265	3.392	.17699E 00	.27520E 00	.45019E 00	291.	.39	118.	.29	265
266	3.405	.14838E 00	.15109E 00	.29947E 00	49.	.29	40.	.29	266
267	3.418	.22464E 00	.14470E 00	.36934E 00	347.	.25	15.	.29	267
268	3.430	.13675E 00	.16861E 00	.30536E 00	57.	.35	40.	.29	268
269	3.443	.11923E 00	.69760E-01	.18899E 00	348.	.53	171.	.29	269
270	3.456	.90116E-01	.19559E 00	.31468E 00	8.	.18	177.	.29	270
271	3.469	.15221E 00	.12812E 00	.21823E 00	118.	.24	132.	.29	271
272	3.482	.14616E 00	.63008E-01	.21572E 00	334.	.41	155.	.29	272
273	3.494	.12370E 00	.12981E 00	.27597E 00	2.	.59	176.	.29	273
274	3.507	.12370E 00	.82163E-01	.20544E 00	41.	.41	39.	.29	274
275	3.520	.34376E 00	.13550E 00	.27441E 00	319.	.42	152.	.28	275
276	3.533	.13321E 00	.12851E 00	.47226E 00	18.	.55	9.	.28	276
277	3.546	.10503F 00	.52505E-01	.18601E 00	324.	.50	141.	.28	277
278	3.558	.14541E 00	.11172E 00	.21675E 00	72.	.20	54.	.28	278
279	3.571	.13374E 00	.89728E-01	.23513E 00	301.	.41	126.	.28	279
280	3.584	.90852E-01	.21182E 00	.40486E 00	111.	.12	98.	.28	280
281	3.597	.94348E-01	.58793E-01	.18964E 00	45.	.39	55.	.28	281
282	3.610	.19572E 00	.11707E 00	.15308E 00	57.	.10	92.	.28	282
283	3.622			.31280E 00	309.	.28		.28	283

284	3.635	.1167E 00	.9/135E-01	.2132E 00	.089	316.	.47	140.	.28	284
285	3.648	.1054E 00	.1442E 00	.2496E 00	.156	120.	.17	125.	.27	285
286	3.661	.1015E 00	.10/99E 00	.2095E 00	.031	105.	.25	105.	.27	286
287	3.674	.13710E 00	.9/569E-01	.2166E 00	.266	97.	.25	97.	.27	287
288	3.686	.12074E 00	.15564E 00	.2763E 00	.266	295.	.30	102.	.27	288
289	3.699	.17046E 00	.10972E 00	.28017E 00	.217	4.	.20	1.	.27	289
290	3.712	.14947E 00	.9/19/5E-01	.24145E 00	.238	28.	.39	34.	.27	290
291	3.725	.94930E-01	.90408E-01	.14539E 00	.307	38.	.35	31.	.27	291
292	3.738	.10394E 00	.69502E-01	.17334E 00	.198	71.	.14	85.	.27	292
293	3.750	.15648E 00	.86083E-01	.24256E 00	.290	359.	.29	179.	.27	293
294	3.763	.10739E 00	.10920E 00	.21629E 00	.010	318.	.04	58.	.27	294
295	3.776	.97160E-01	.1/643E 00	.27359E 00	.290	125.	.31	127.	.26	295
296	3.789	.52472E-01	.1/0/99E-01	.12327E 00	.149	308.	.26	104.	.26	296
297	3.802	.12264E 00	.93044E-01	.21568E 00	.137	59.	.24	17.	.26	297
298	3.814	.94218E-01	.10408E 00	.19830E 00	.050	10.	.26	18.	.26	298
299	3.827	.89430E-01	.73400E-01	.16283E 00	.098	33.	.27	34.	.26	299
300	3.840	.19343E 00	.15473E 00	.34817E 00	.111	69.	.37	74.	.26	300
301	3.853	.12890E 00	.93/01E-01	.22260E 00	.158	66.	.51	66.	.26	301
302	3.866	.12070E 00	.69276E-01	.19018E 00	.271	330.	.01	14.	.26	302
303	3.878	.10878E 00	.75661E-01	.18444E 00	.180	14.	.39	21.	.26	303
304	3.891	.13544E 00	.68617E-01	.20406E 00	.327	115.	.50	122.	.26	304
305	3.904	.93879E-01	.60603E-01	.15448E 00	.215	80.	.29	96.	.26	305
306	3.917	.14439E 00	.10293E 00	.24783E 00	.169	30.	.09	151.	.26	306
307	3.930	.67387E-01	.15245E 00	.21984E 00	.387	320.	.26	144.	.25	307
308	3.942	.75254E-01	.60/60E-01	.13601E 00	.107	325.	.44	142.	.25	308
309	3.955	.10086E 00	.49/40E-01	.15060E 00	.339	30.	.05	24.	.25	309
310	3.968	.83832E-01	.88294E-01	.17213E 00	.026	38.	.28	36.	.25	310
311	3.981	.11371E 00	.13611E 00	.24982E 00	.090	43.	.16	18.	.25	311
312	3.994	.16400E 00	.68287E-01	.23229E 00	.412	298.	.07	88.	.25	312
313	4.006	.13718E 00	.74/74E-01	.21195E 00	.294	323.	.30	149.	.25	313
314	4.019	.28635E-01	.41814E-01	.70450E-01	.187	37.	.47	38.	.25	314
315	4.032	.11956E 00	.14/29E 00	.26685E 00	.104	63.	.18	85.	.25	315
316	4.045	.17041E 00	.97807E-01	.26822E 00	.271	103.	.30	127.	.25	316
317	4.058	.11084E 00	.12335E 00	.23419E 00	.053	13.	.08	36.	.25	317
318	4.070	.83011E-01	.55034E-01	.13805E 00	.203	61.	.26	53.	.25	318
319	4.083	.14149E 00	.11428E 00	.25577E 00	.106	6.	.06	39.	.24	319
320	4.096	.11057E 00	.12029E 00	.23086E 00	.042	119.	.25	102.	.24	320
321	4.109	.14692E 00	.66866E-01	.21379E 00	.374	333.	.09	148.	.24	321
322	4.122	.12693E 00	.41546E-01	.16848E 00	.507	336.	.31	137.	.24	322
323	4.134	.12227E 00	.85497E-01	.20777E 00	.177	17.	.22	8.	.24	323
324	4.147	.13963E 00	.53199E-01	.19283E 00	.448	98.	.46	97.	.24	324
325	4.160	.17288E 00	.47285E-01	.22017E 00	.570	8.	.30	13.	.24	325
326	4.173	.86987E-01	.15/45E 00	.24444E 00	.288	339.	.39	168.	.24	326
327	4.186	.78372E-01	.54675E-01	.13305E 00	.178	106.	.31	99.	.24	327
328	4.198	.95031E-01	.10400E 00	.19903E 00	.045	110.	.16	159.	.24	328
329	4.211	.10095E 00	.10919E 00	.21014E 00	.039	358.	.24	163.	.24	329
330	4.224	.82330E-01	.81528E-01	.16386E 00	.005	86.	.38	95.	.24	330
331	4.237	.90296E-01	.65519E-01	.15582E 00	.159	335.	.34	150.	.24	331
332	4.250	.57023E-01	.11042E 00	.16744E 00	.319	79.	.40	82.	.24	332
333	4.262	.61996E-01	.11597E 00	.17796E 00	.303	105.	.24	129.	.23	333
334	4.275	.59852E-01	.60613E-01	.12046E 00	.006	42.	.61	44.	.23	334
335	4.288	.65912E-01	.14574E 00	.21165E 00	.377	357.	.26	25.	.23	335
336	4.301	.11654E 00	.86831E-01	.18537E 00	.257	65.	.43	70.	.23	336
337	4.314	.37185E-01	.57516E-01	.10470E 00	.290	76.	.24	45.	.23	337
338	4.326	.49463E-01	.53420E-01	.10288E 00	.038	332.	.08	120.	.23	338
339	4.339	.57567E-01	.85246E-01	.14281E 00	.194	99.	.21	75.	.23	339
340	4.352	.75926E-01	.13220E 00	.20813E 00	.270	38.	.19	25.	.23	340
341	4.365	.89663E-01	.10213E 00	.19179E 00	.065	55.	.12	98.	.23	341
342	4.378	.97961E-01	.74879E-01	.17284E 00	.134	37.	.11	14.	.23	342
343	4.390	.91538E-01	.59571E-01	.15117E 00	.212	59.	.61	67.	.23	343

Variable vs. Time Plots

The current and temperature data are plotted in a variety of ways. Included are both averaged and filtered data. A one hour average refers to a series with one point per hour, that point being the vector average of the basic series over that hour for speed, or the scalar average for temperature. To obtain the Gaussian filtered series, the one hour averaged series was passed through a Gaussian filter with a half width of one day and the resulting series subsampled at one per day.

The plots are:

- p. 83 - Record 5921 plotted as a one hour averaged series and as a Gaussian filtered series. The length of a "stick" is proportional to speed, its direction corresponds to geographic direction (magnetic deviation has been applied). The direction of north is indicated.
- pp. 84-93 - Line plots of the one hour averaged version of all variables for all the records.
- p. 94 - A composite stick plot of the Gaussian filtered velocities.
- p. 95 - A day-by-day composite of the Gaussian filtered vectors with the "sticks" arranged by depth.
- p. 96 - A composite line plot of the one hour averaged north components.
- p. 97 - A composite line plot of the one hour averaged east components.
- p. 98 - A composite line plot of the one hour averaged speeds.
- p. 99 - A composite of the Gaussian filtered temperatures.
- pp. 100-117 - Expanded scalar line plots of east, north and temperature for selected segments of basic series.

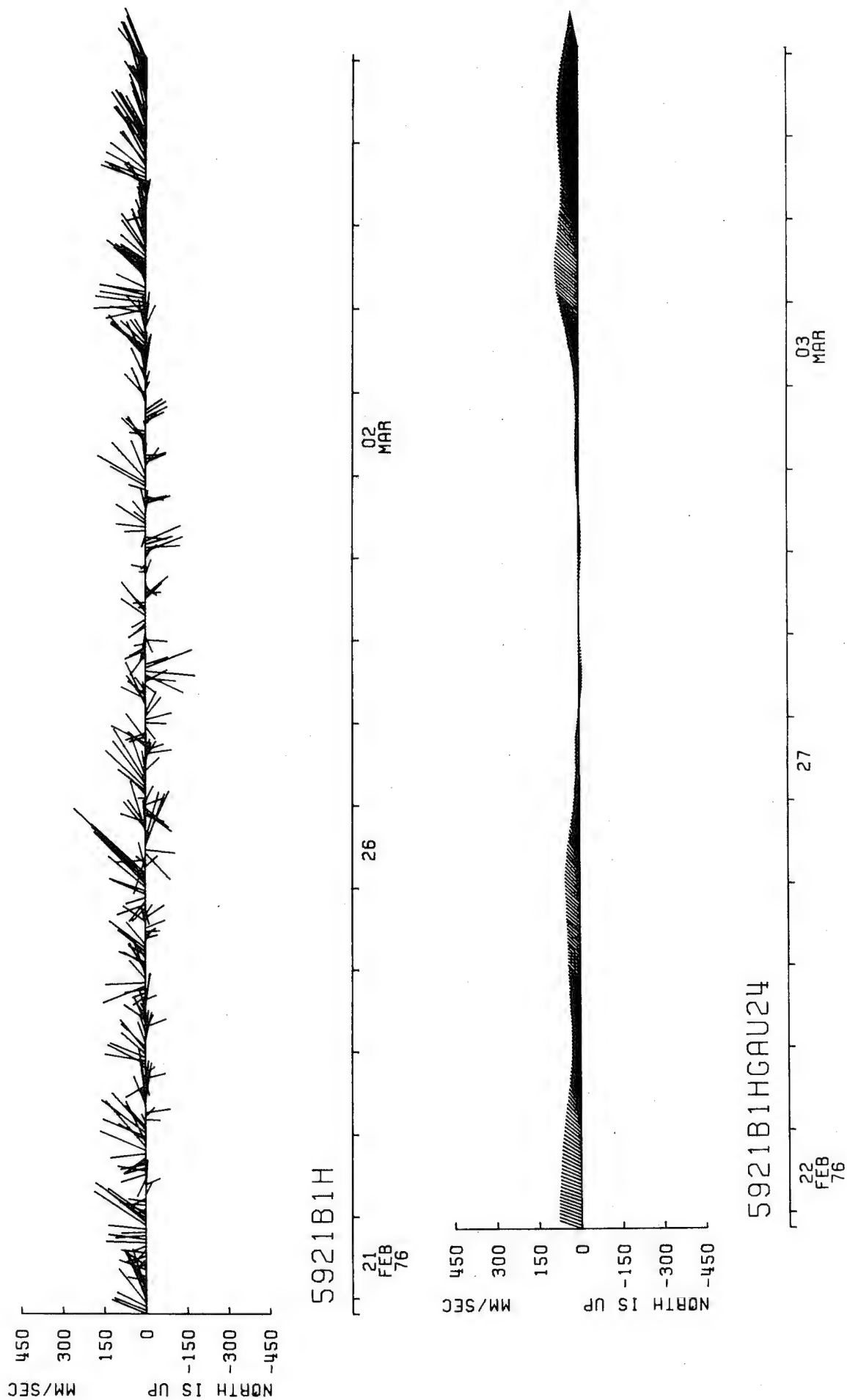
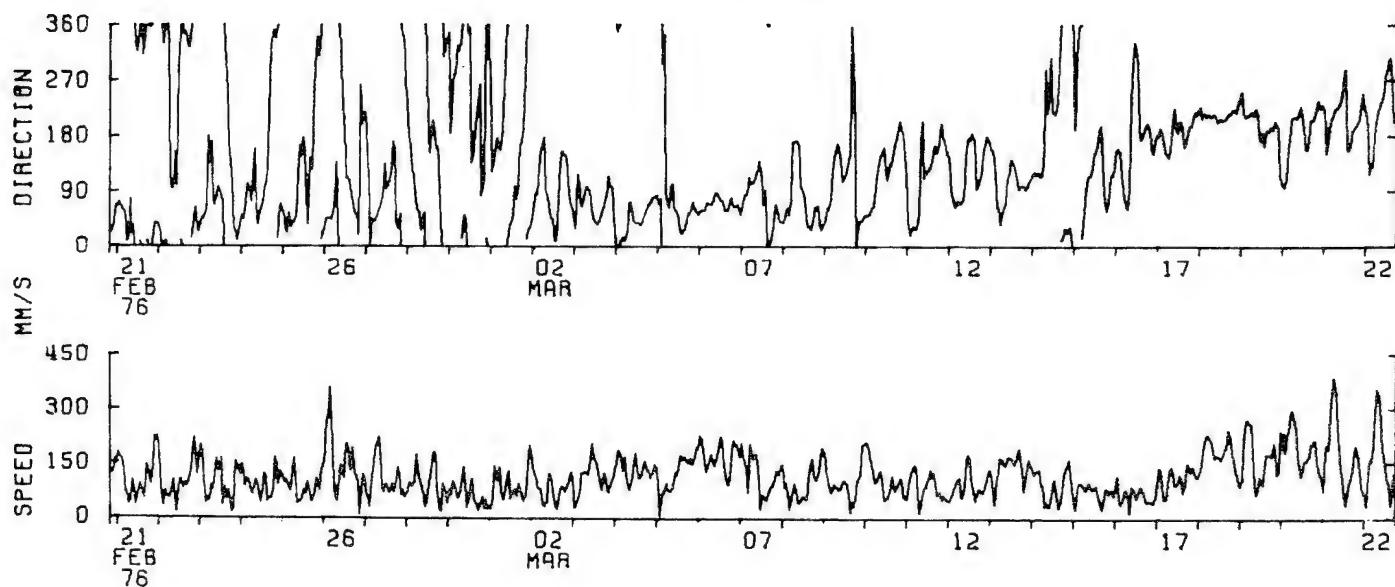
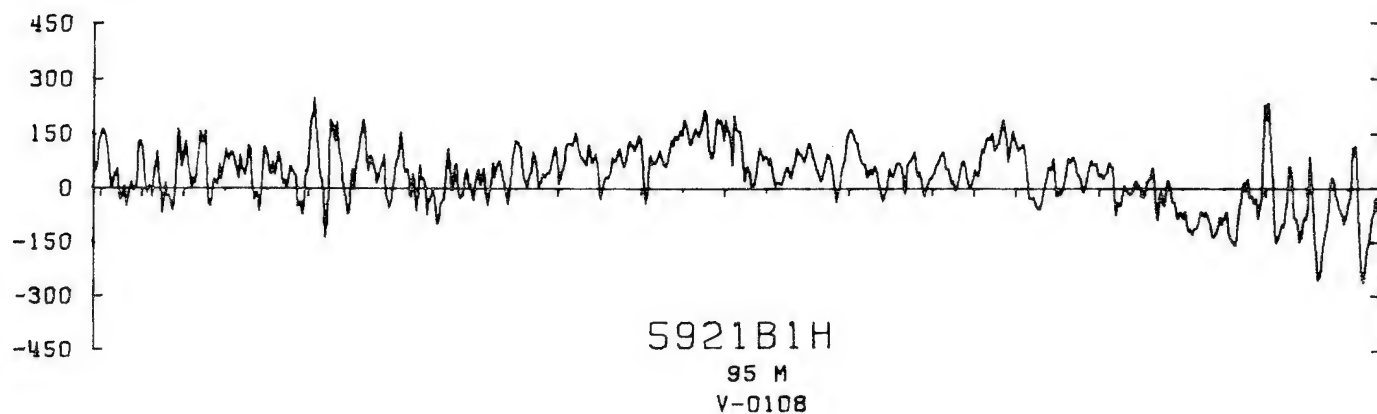
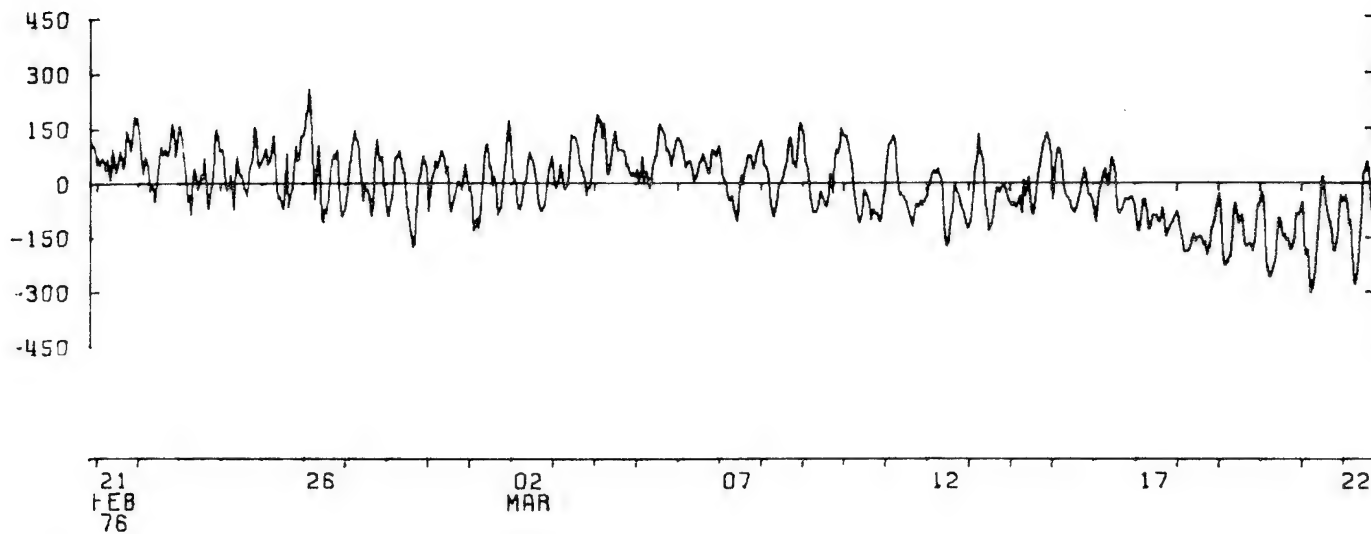
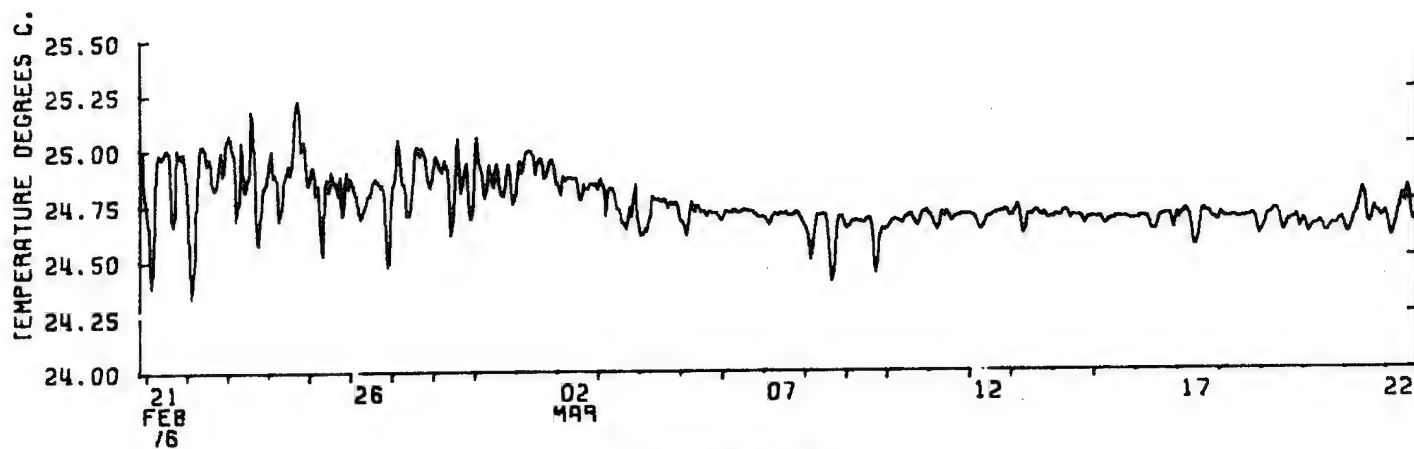
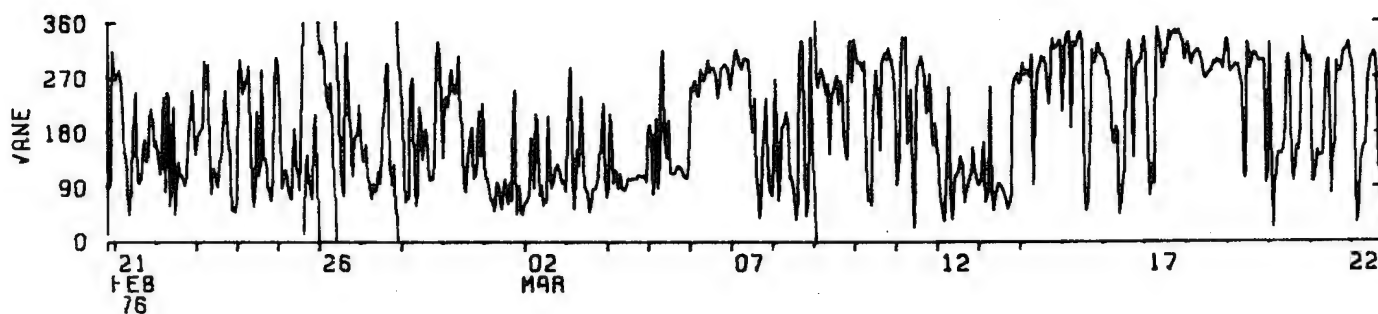
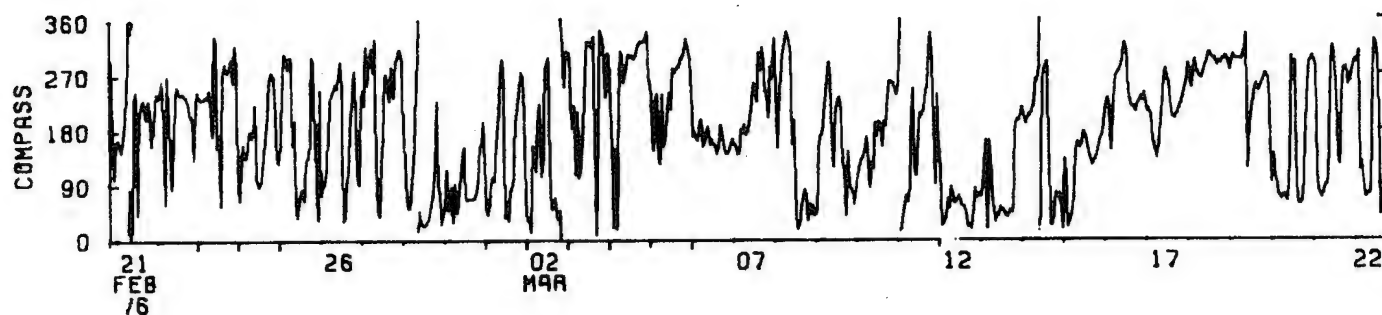


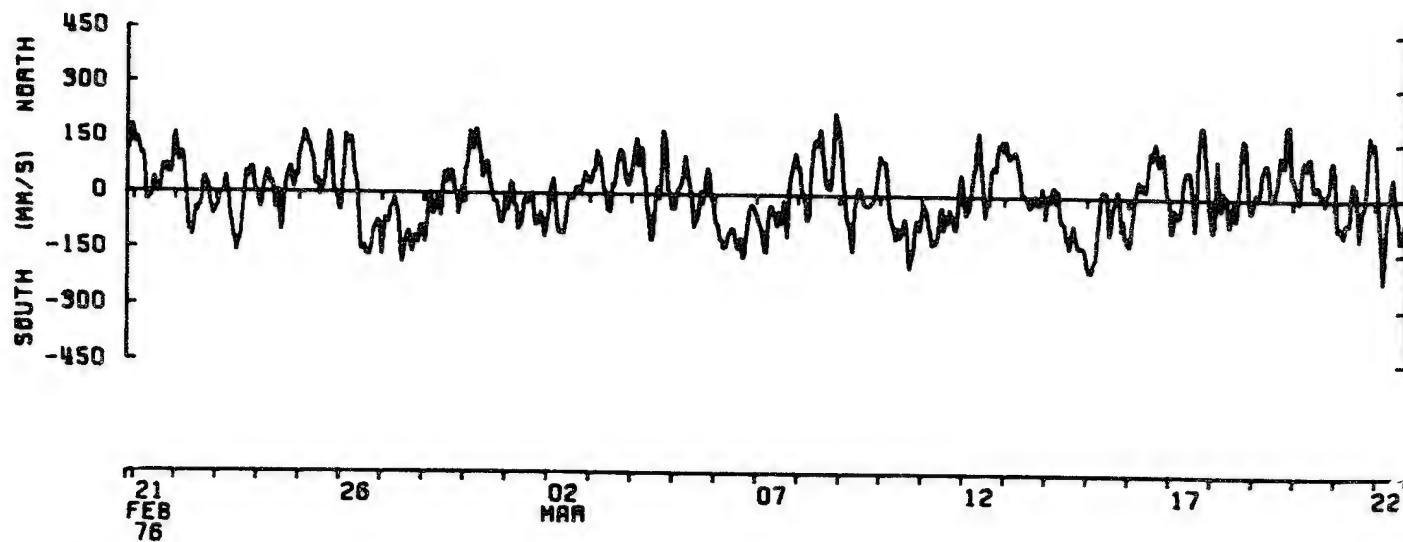
Figure 4. Stick plots of the 1 hour Gaussian filtered data and the 1 hour averaged data for 5921.





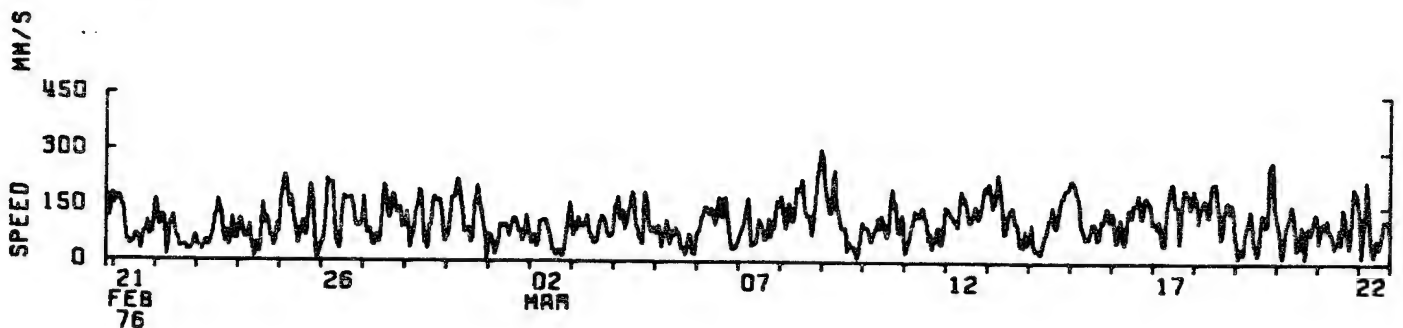
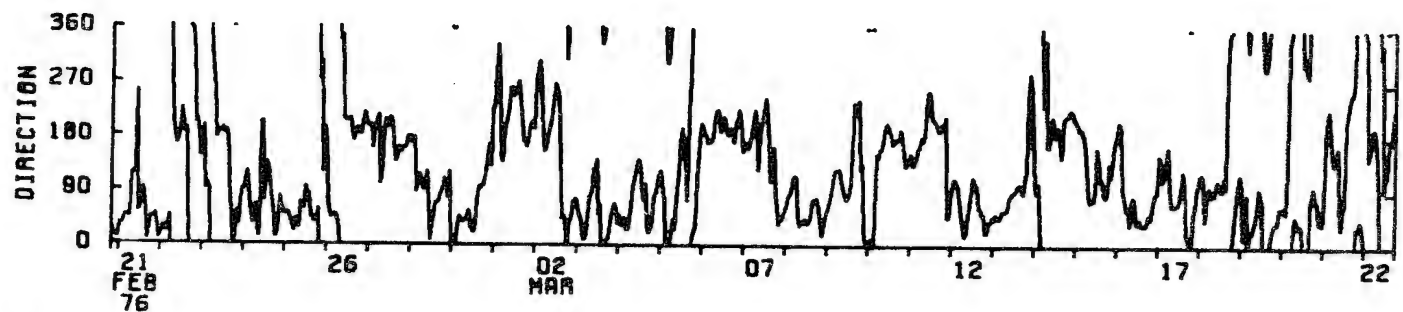
5921B1H

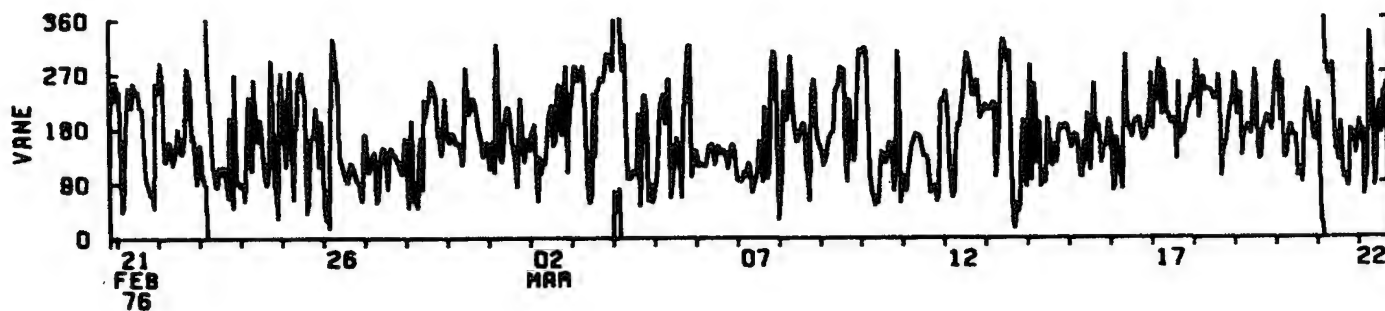
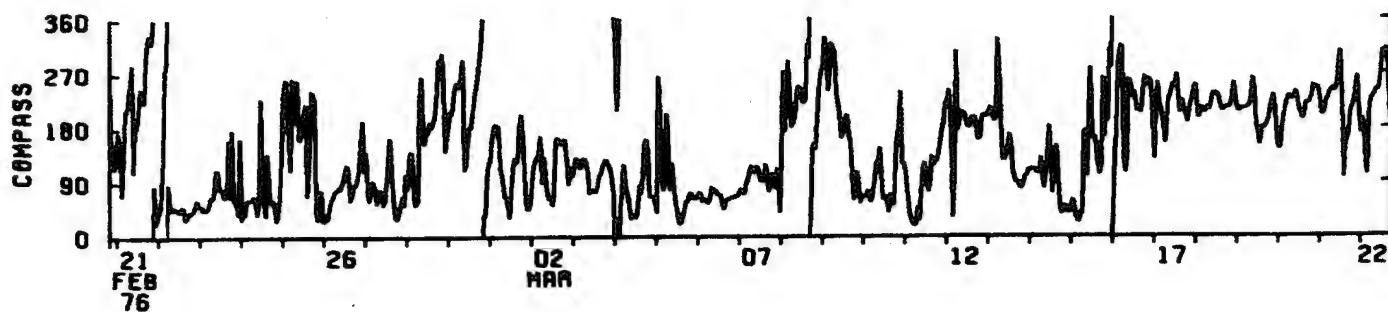
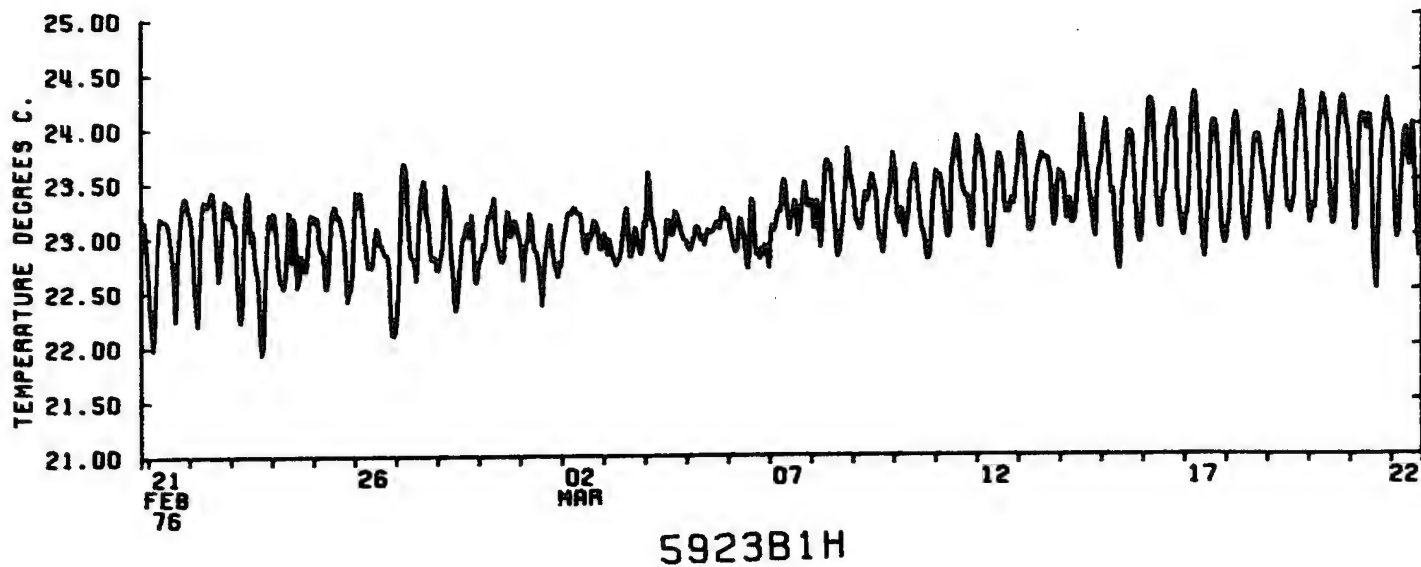


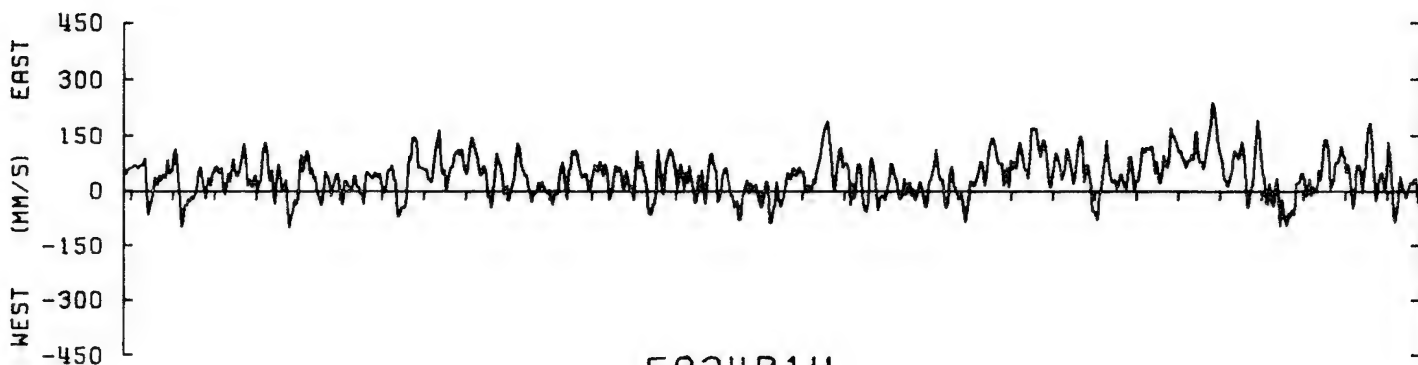
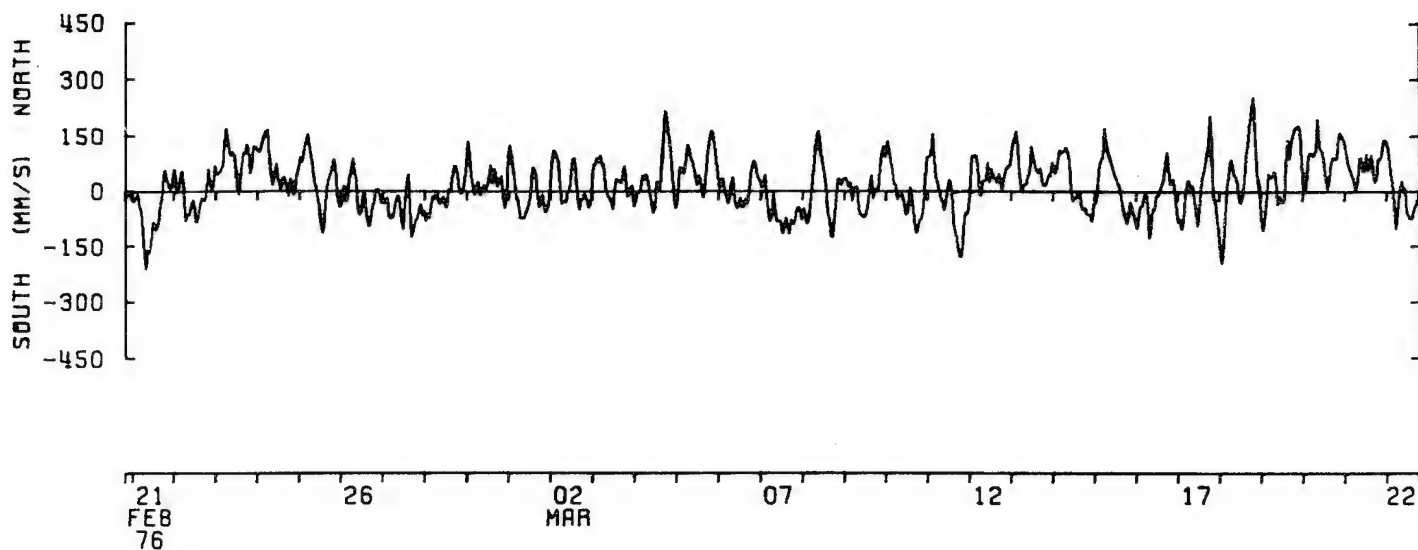


5923B1H

144 M
V-0139



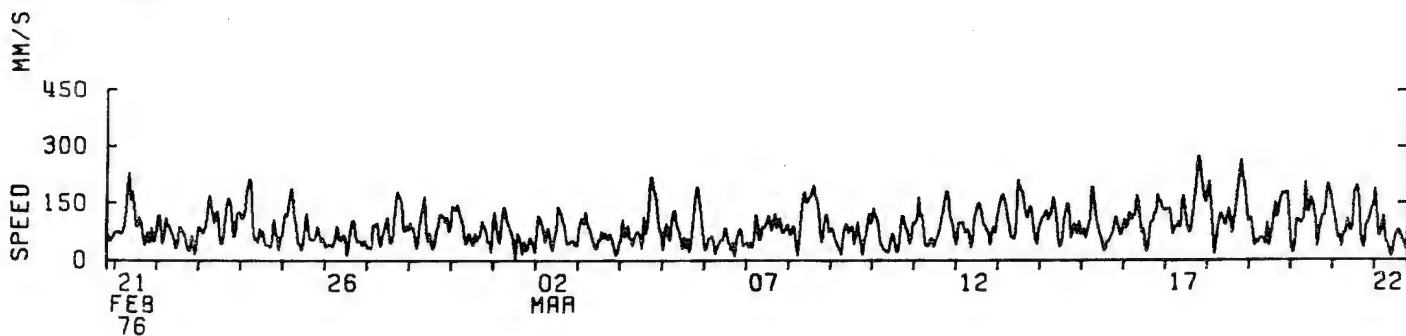
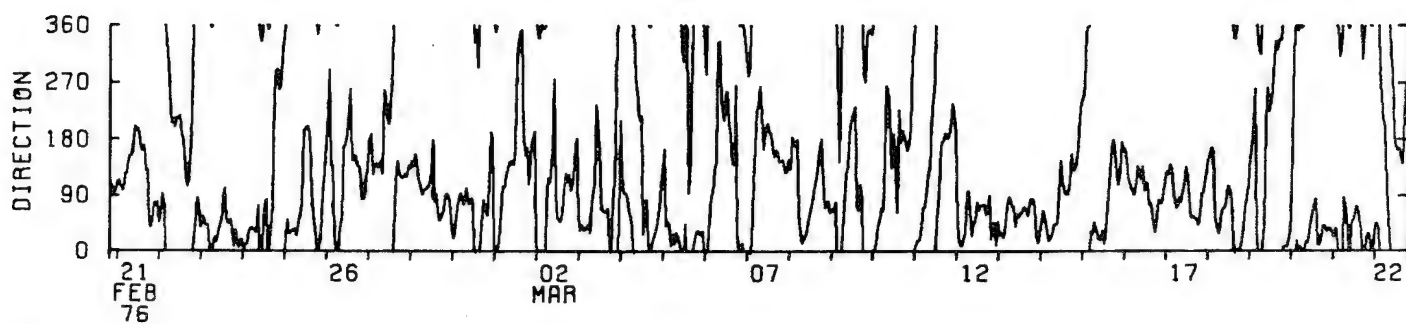


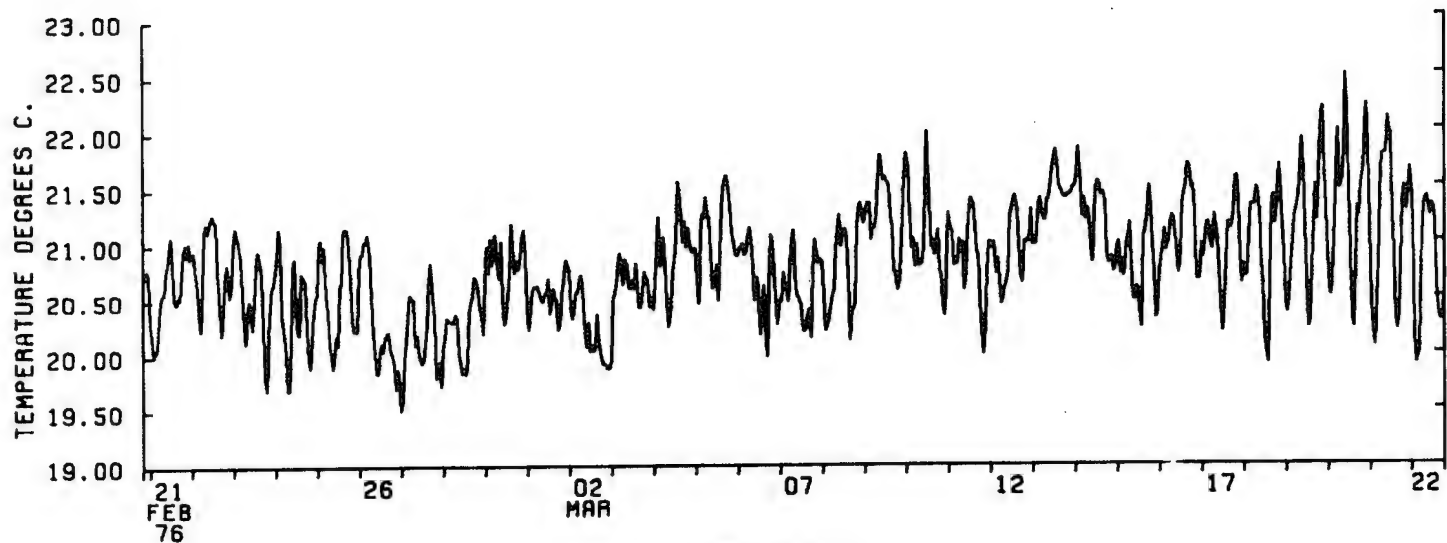


5924B1H

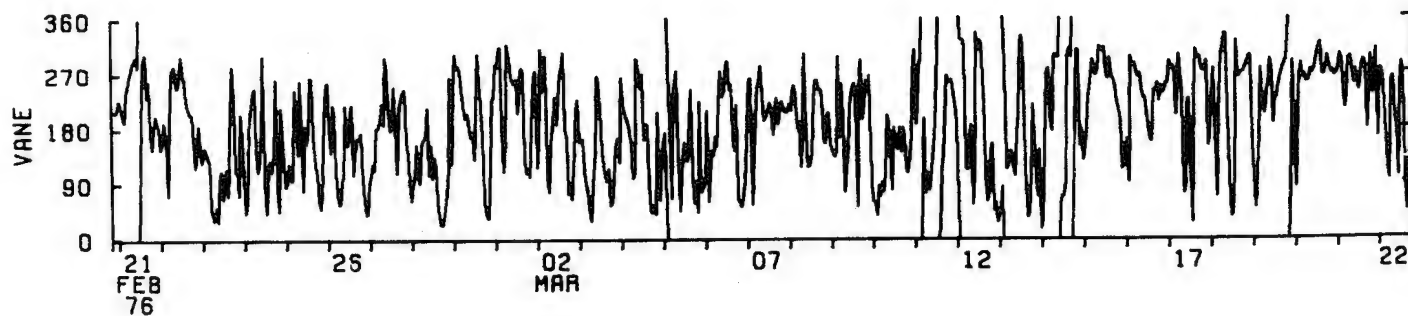
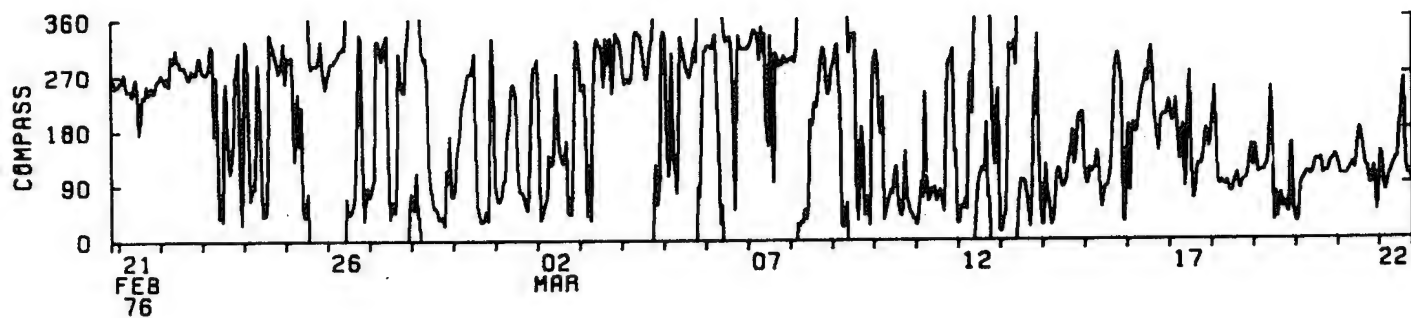
193 M

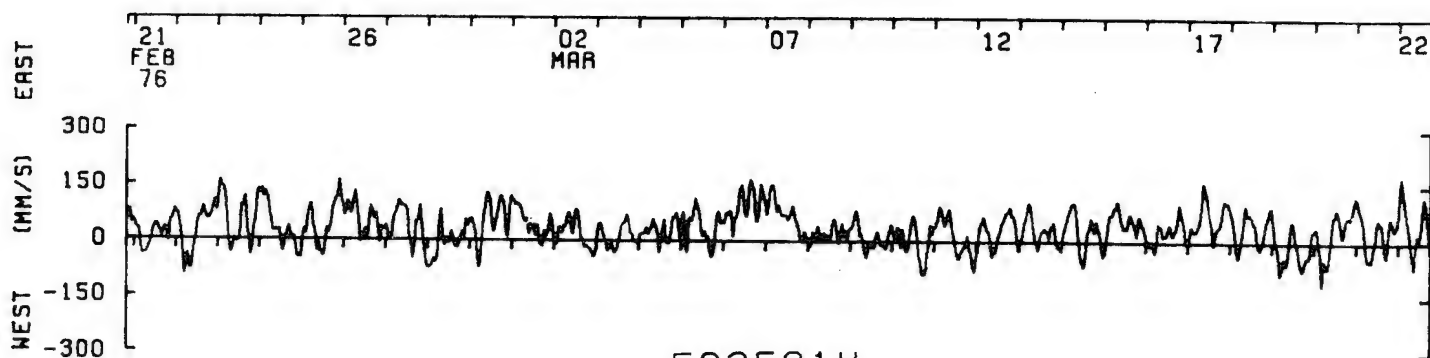
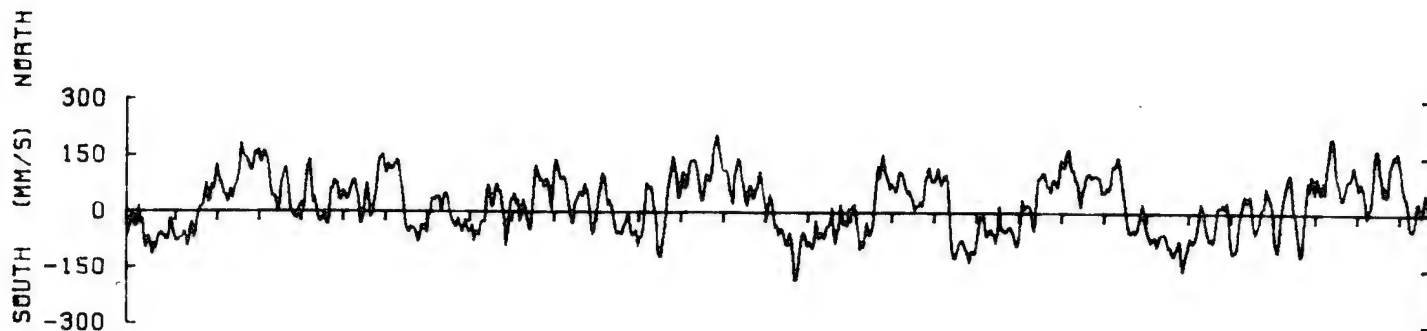
V-0181





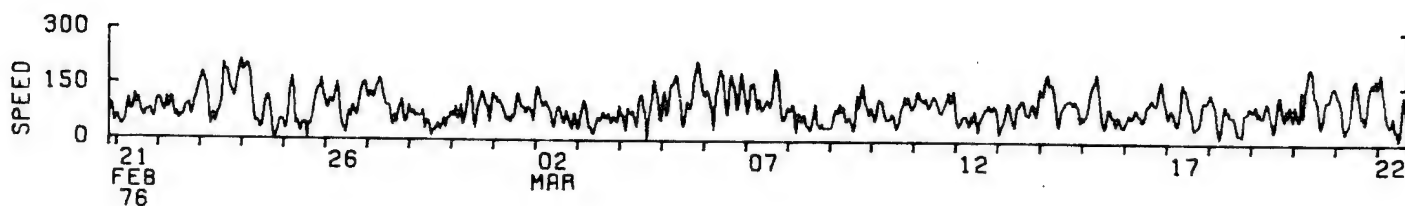
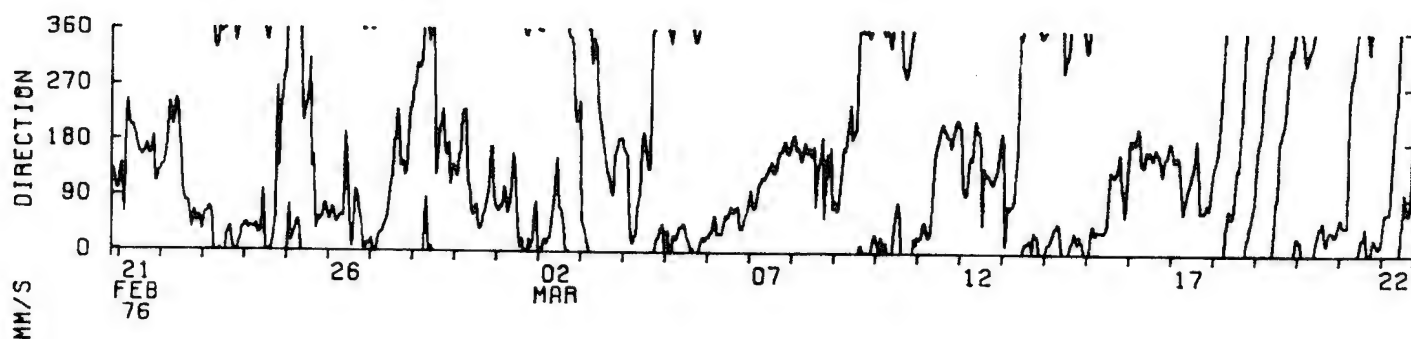
5924B1H

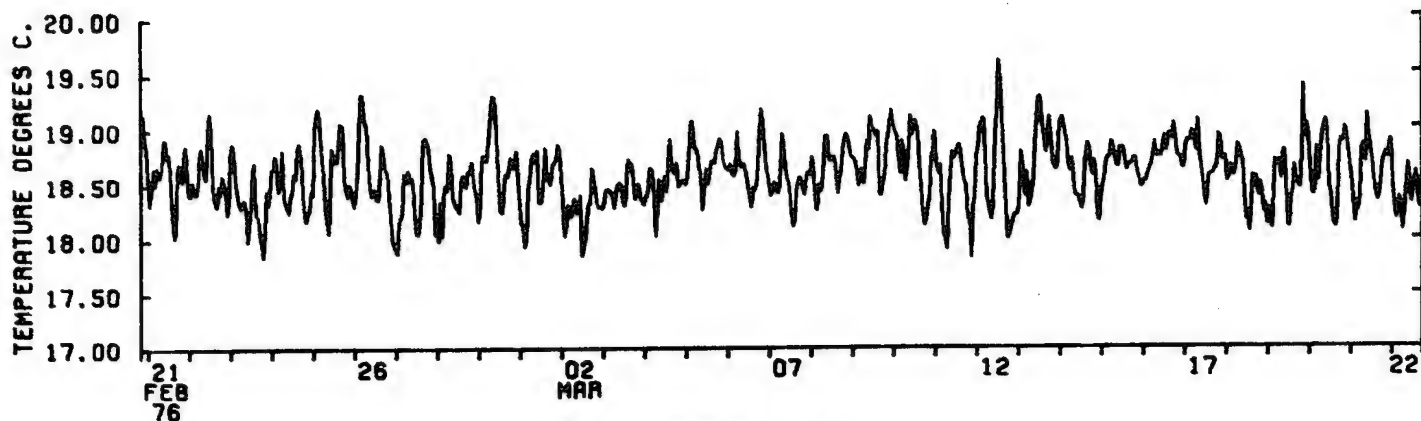




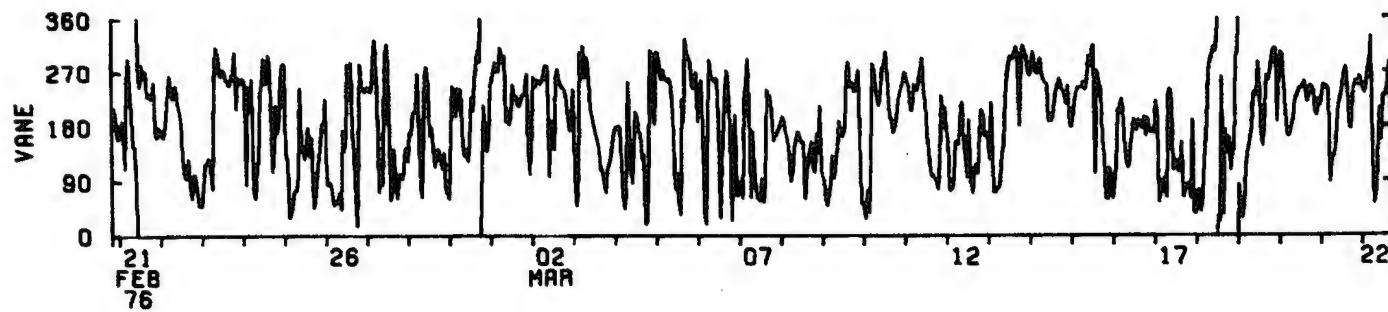
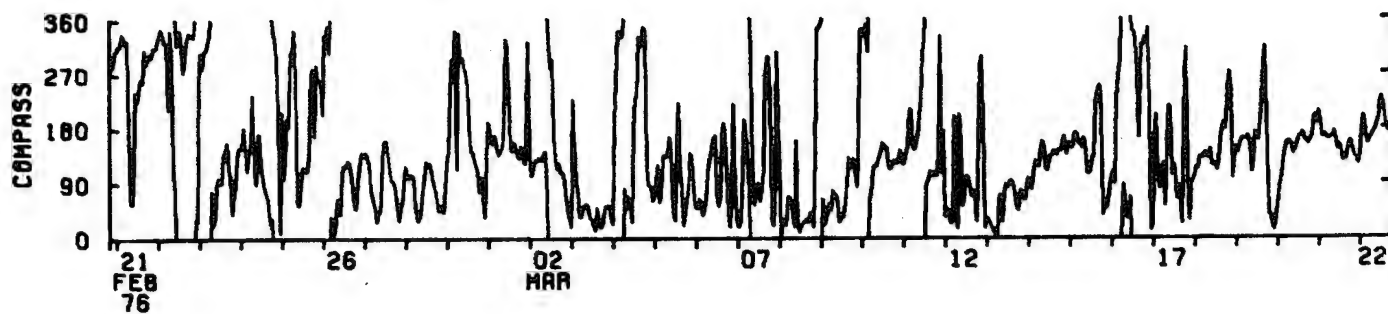
5925A1H

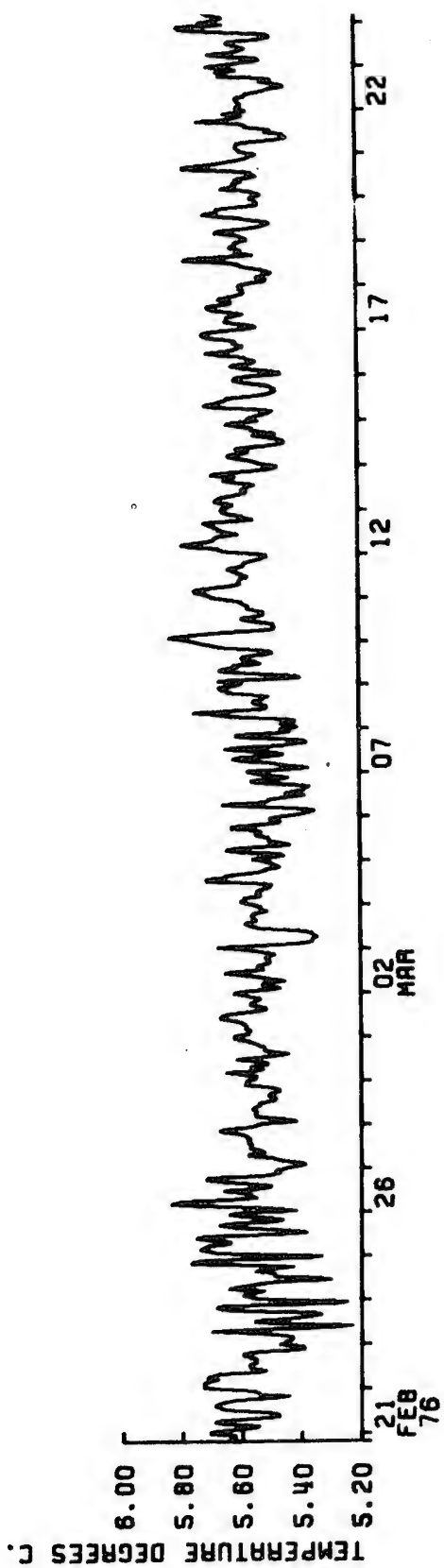
243 M
V-0164





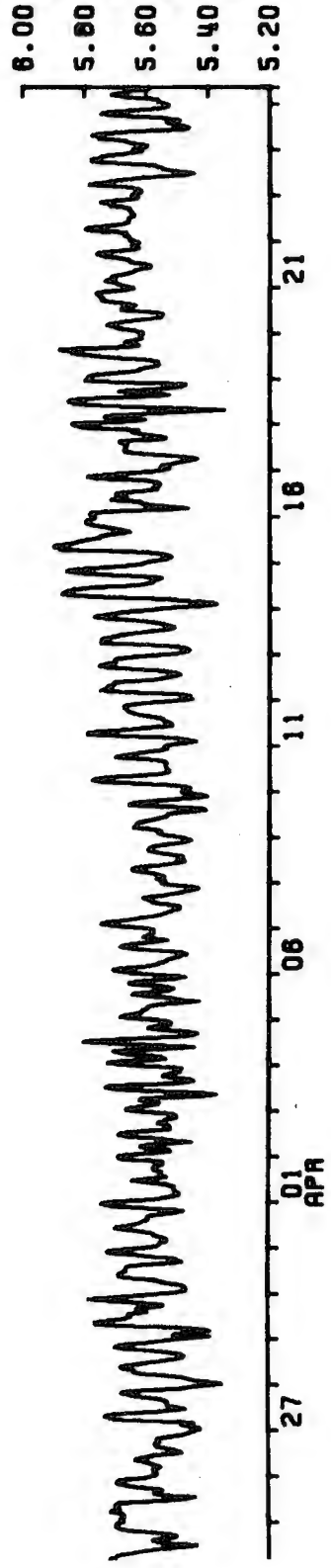
5925A1H

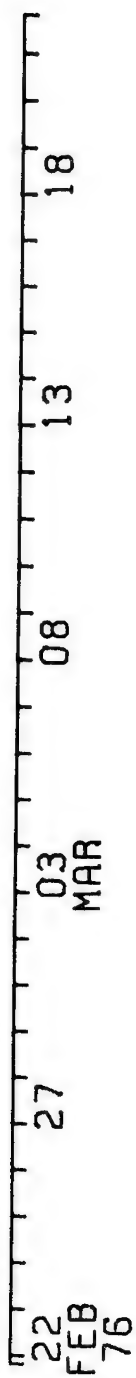




5927A1H

TEMPERATURE DEGREES C.





300
150
0

MM/SEC

5921



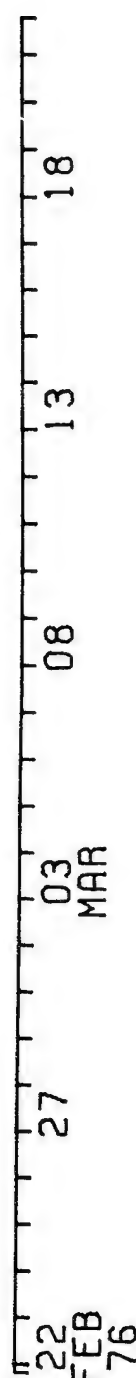
5923



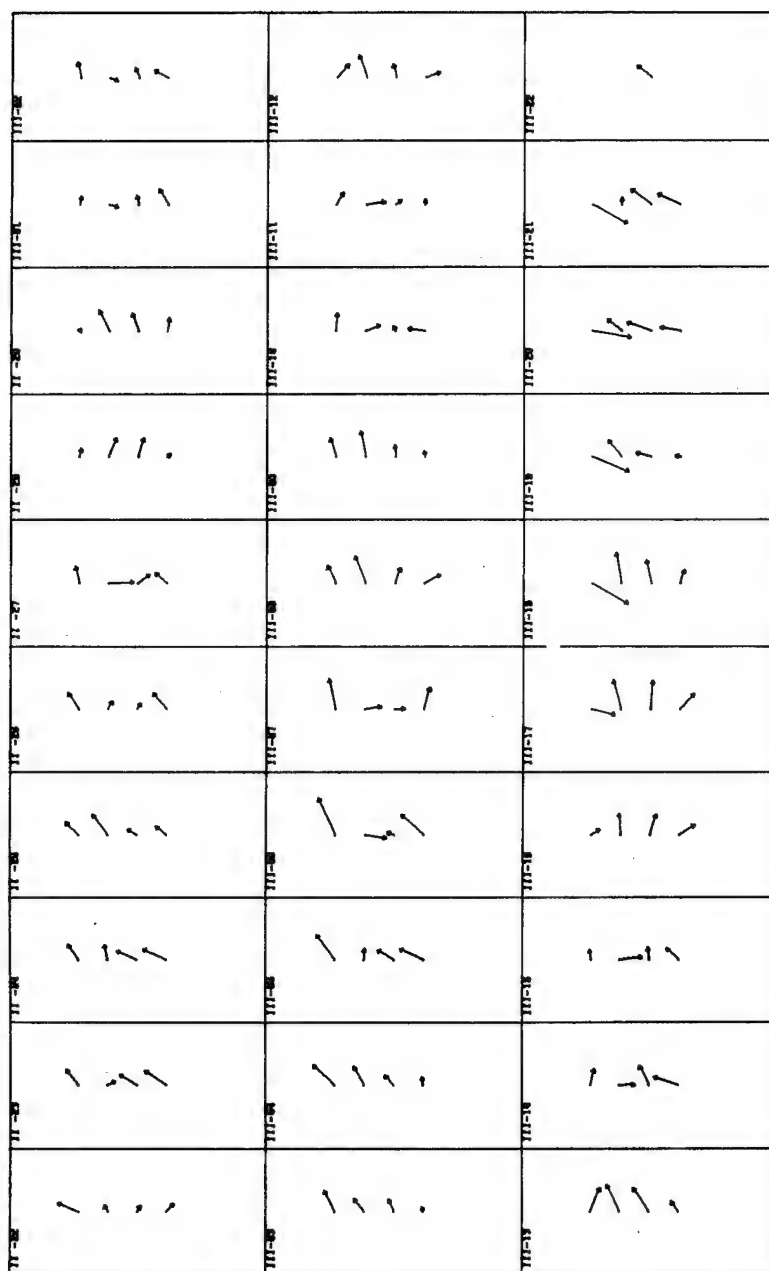
5924



5925



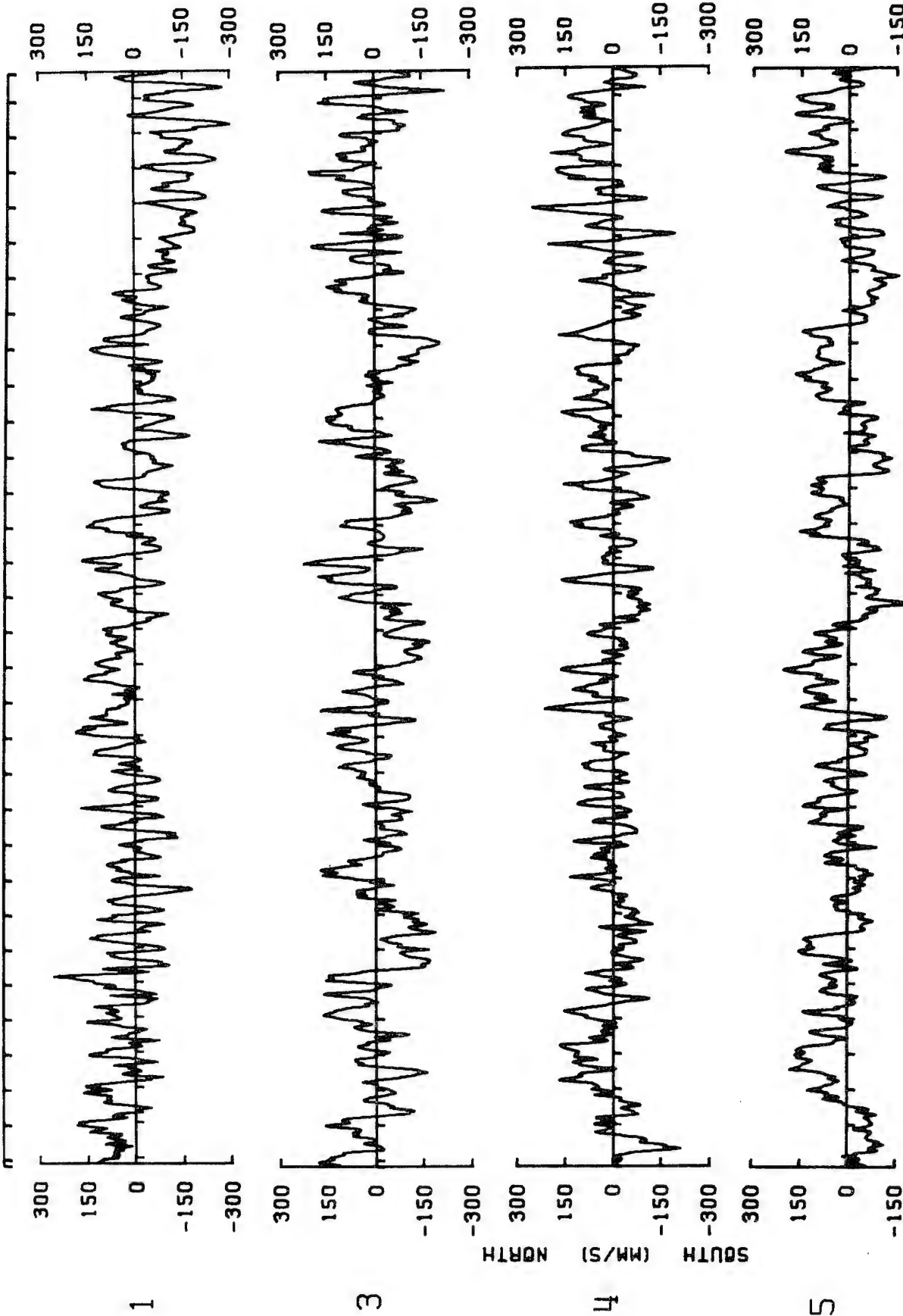
NORTH IS UP



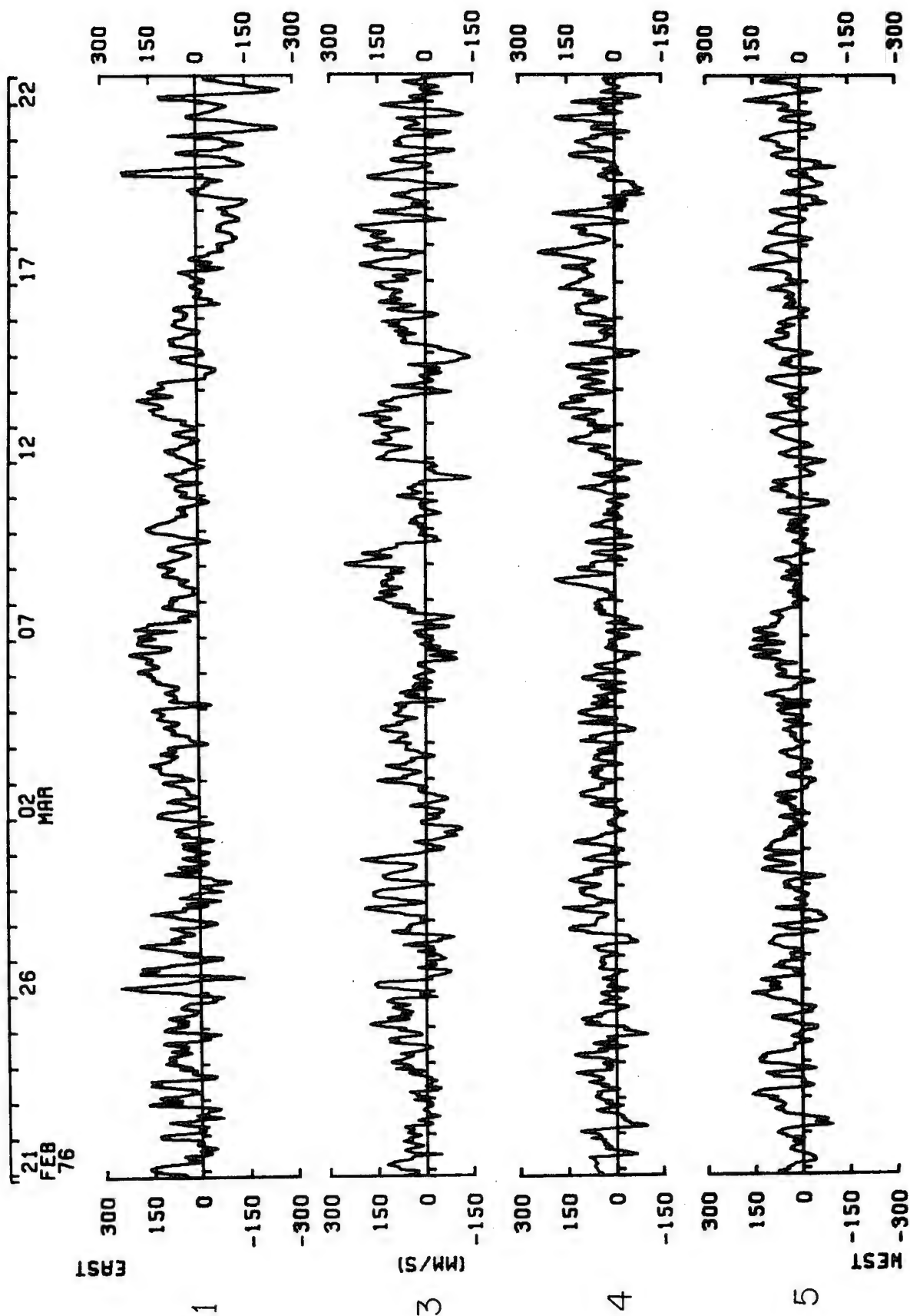
0 250
mm/s

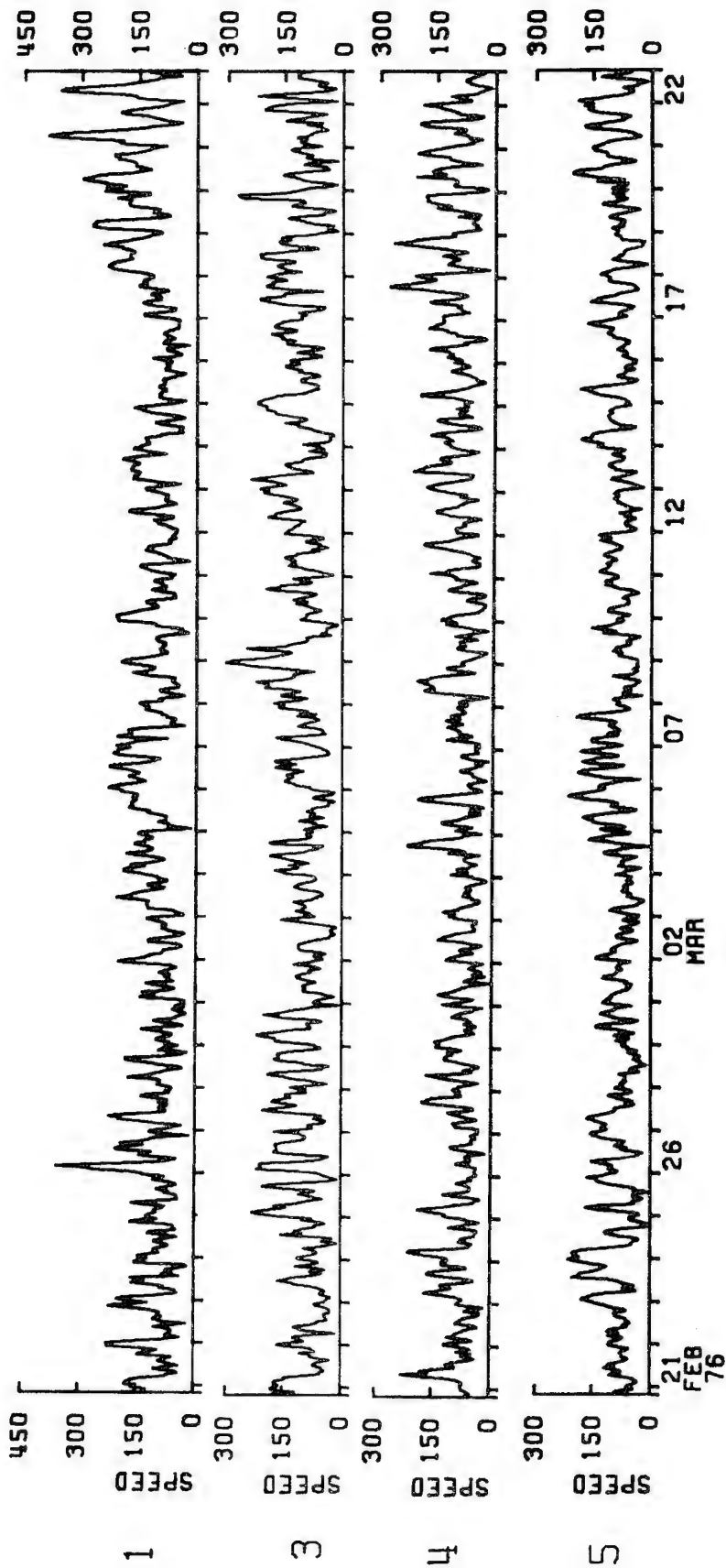
1 3 4 5

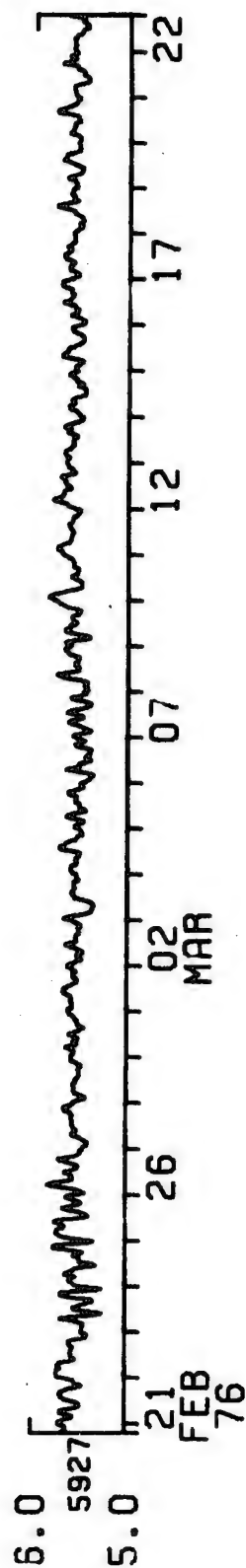
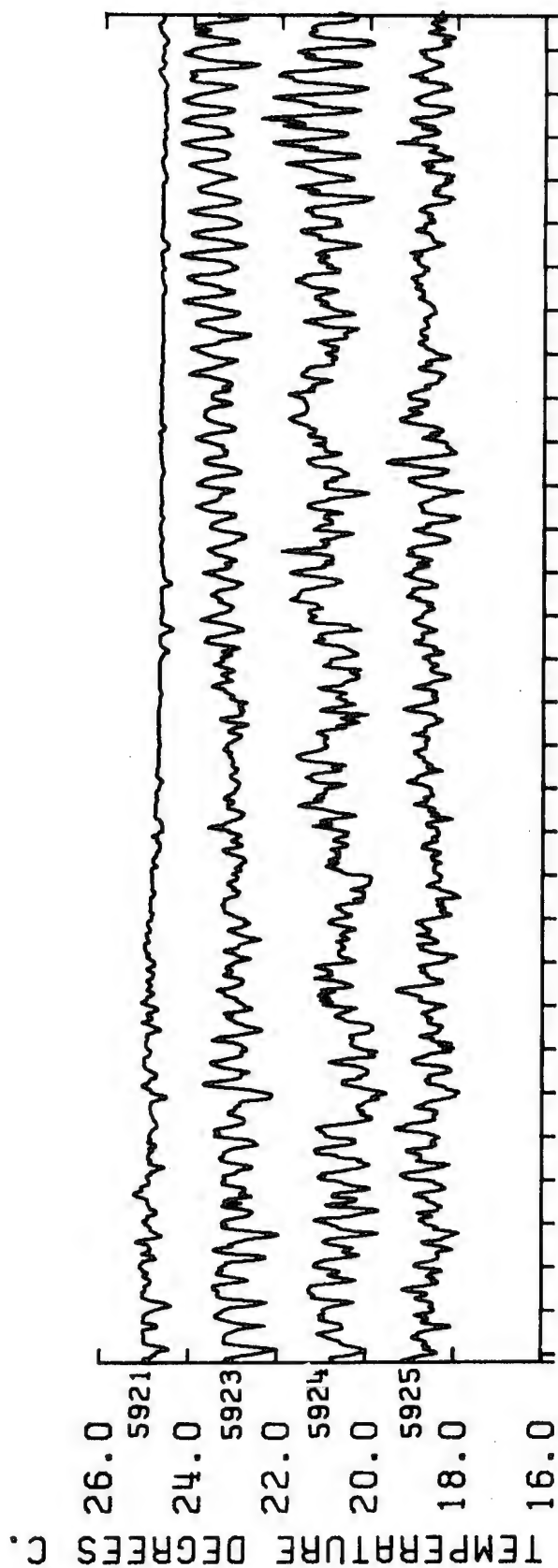
Daily averages from four current meters plotted by depth
1) 5921 3) 5923 4) 5924 5) 5925

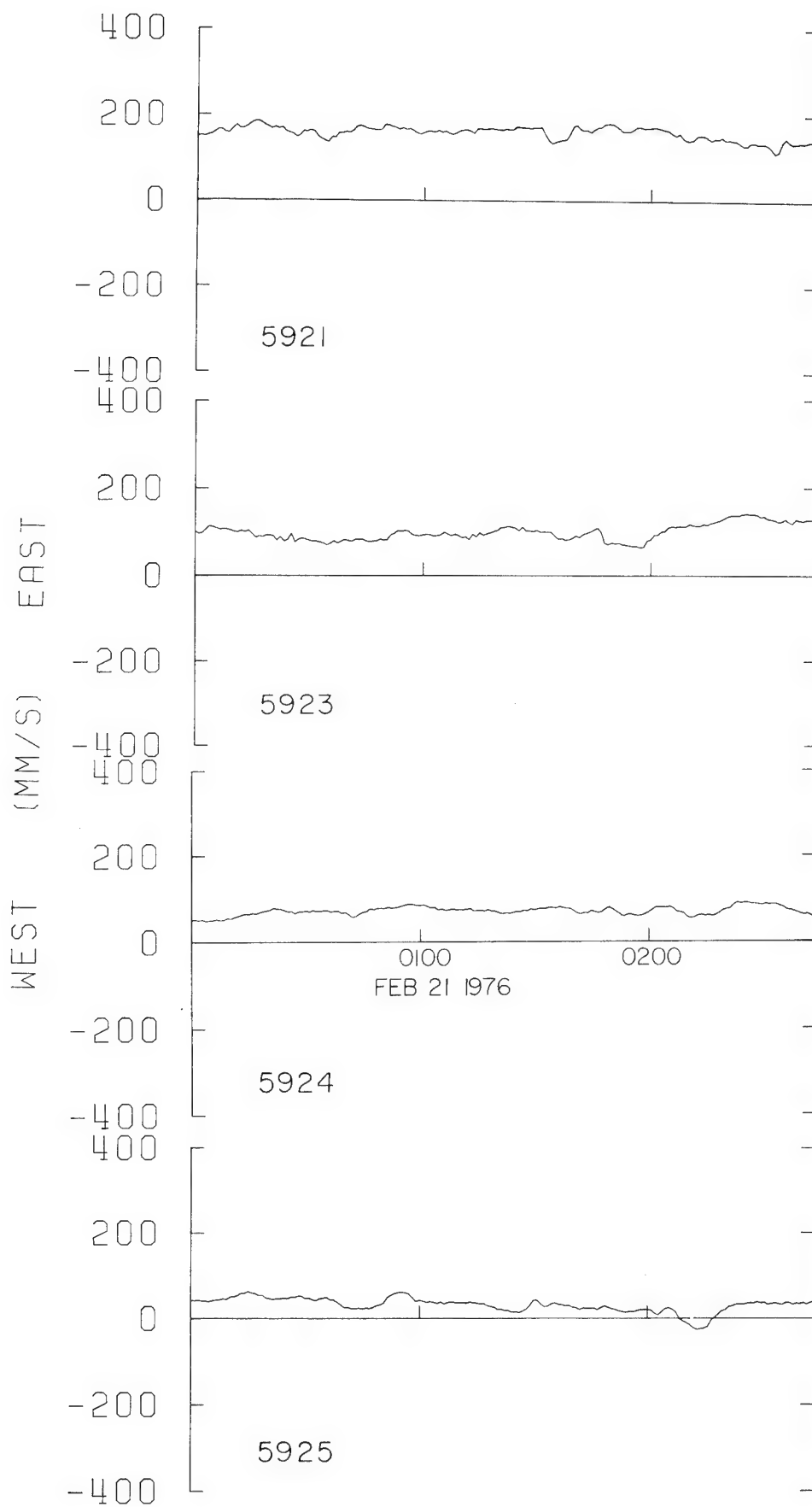


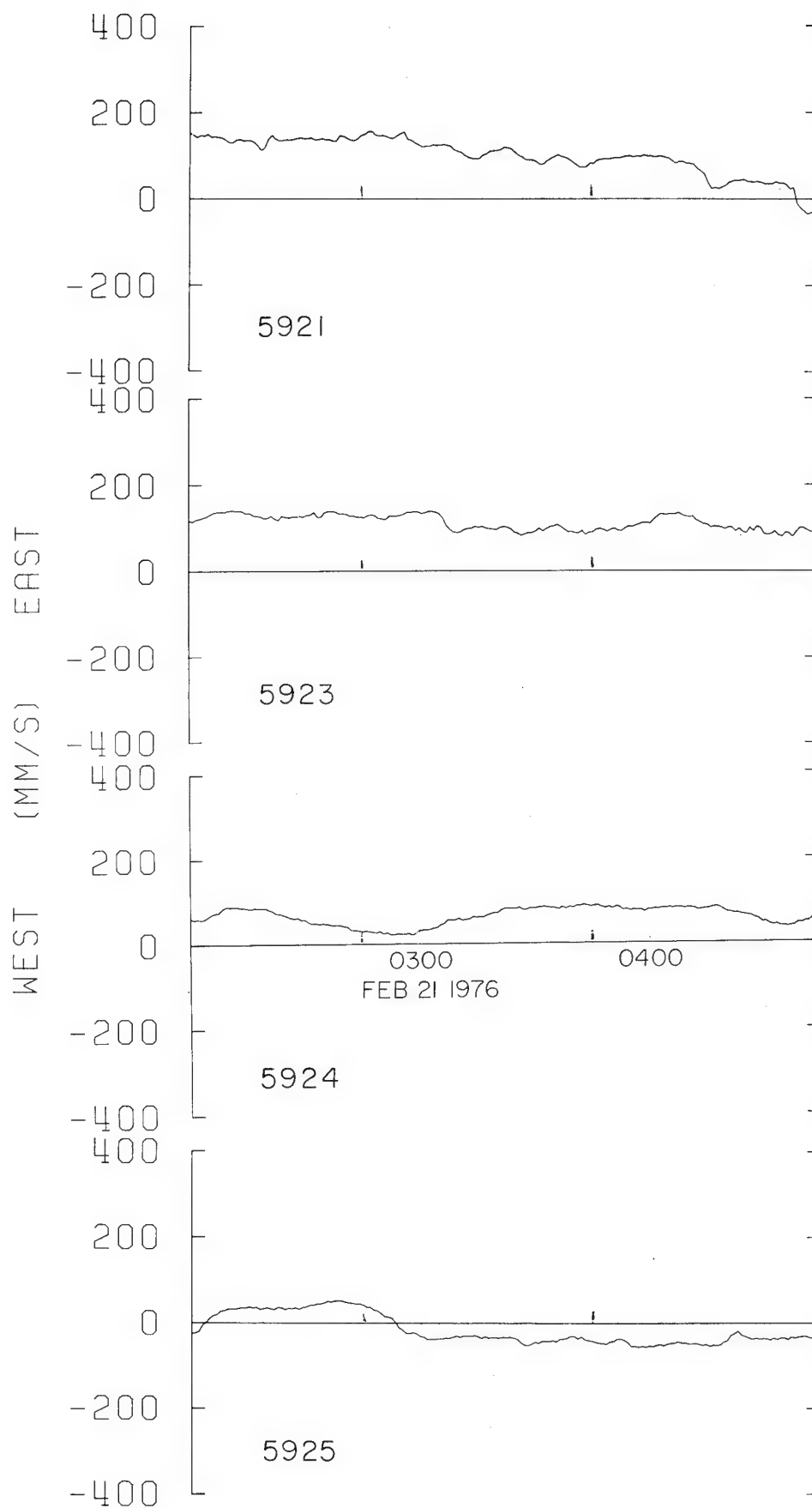
21 26 02 22
FEB MAR
76

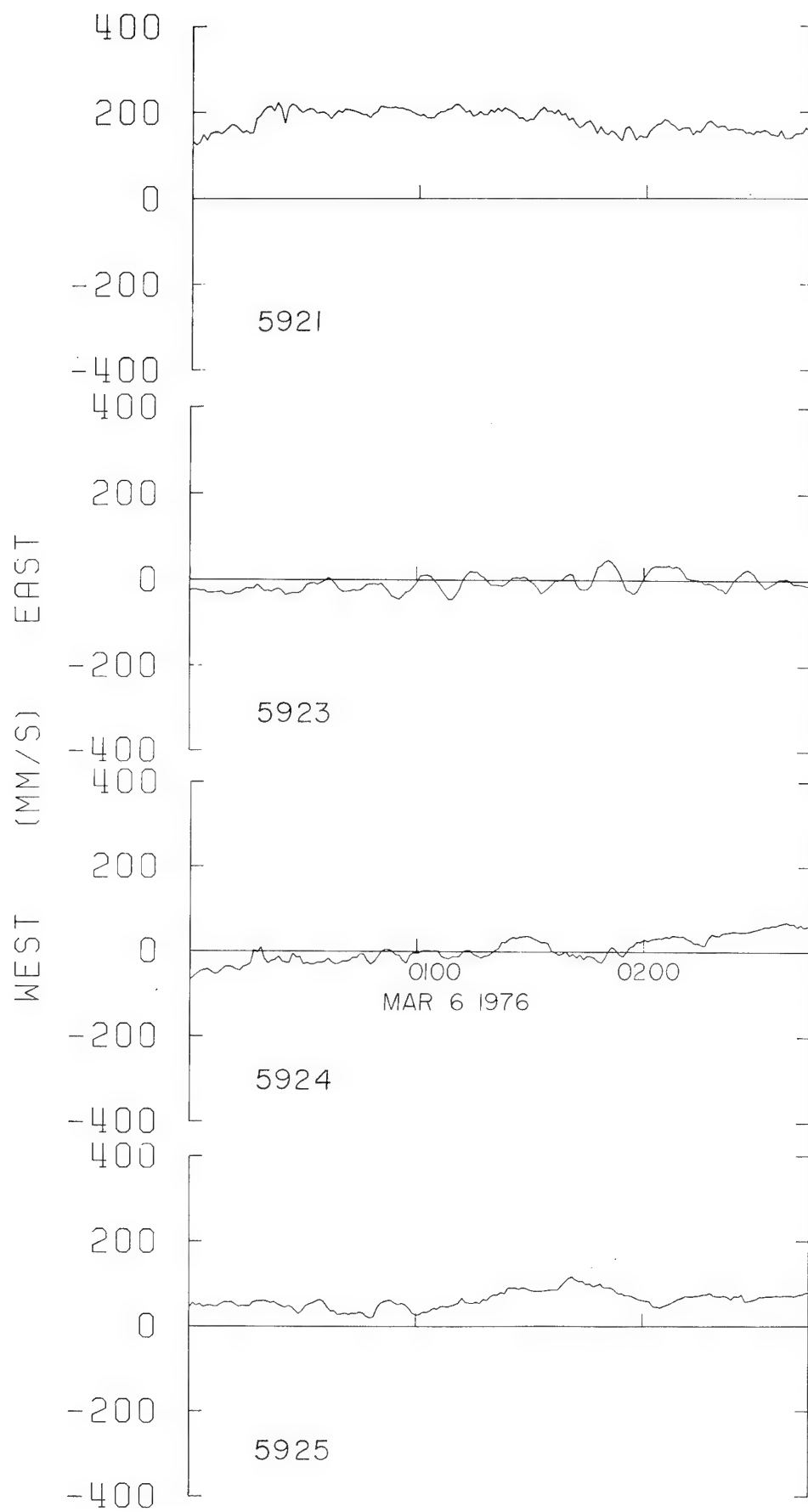


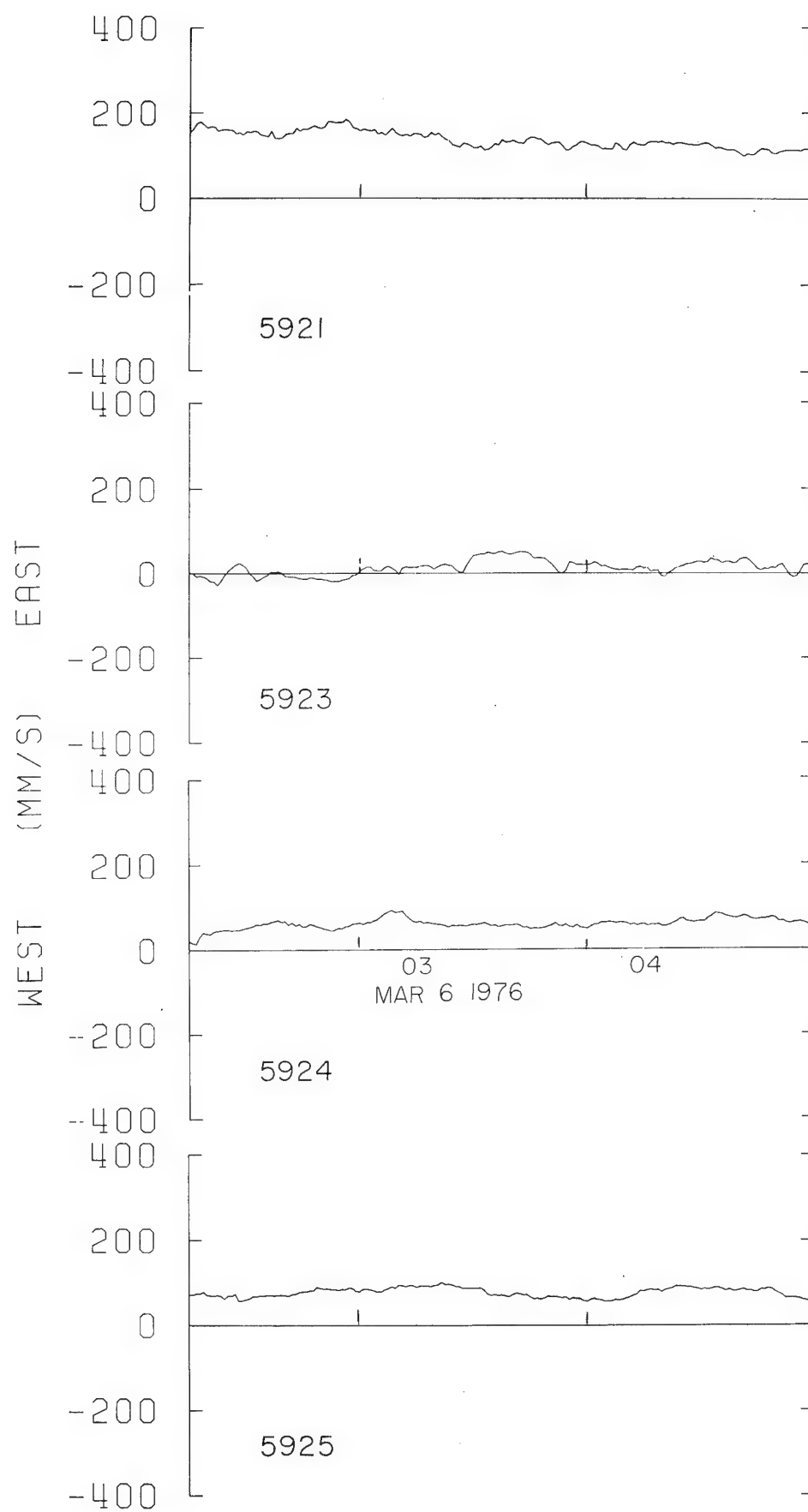


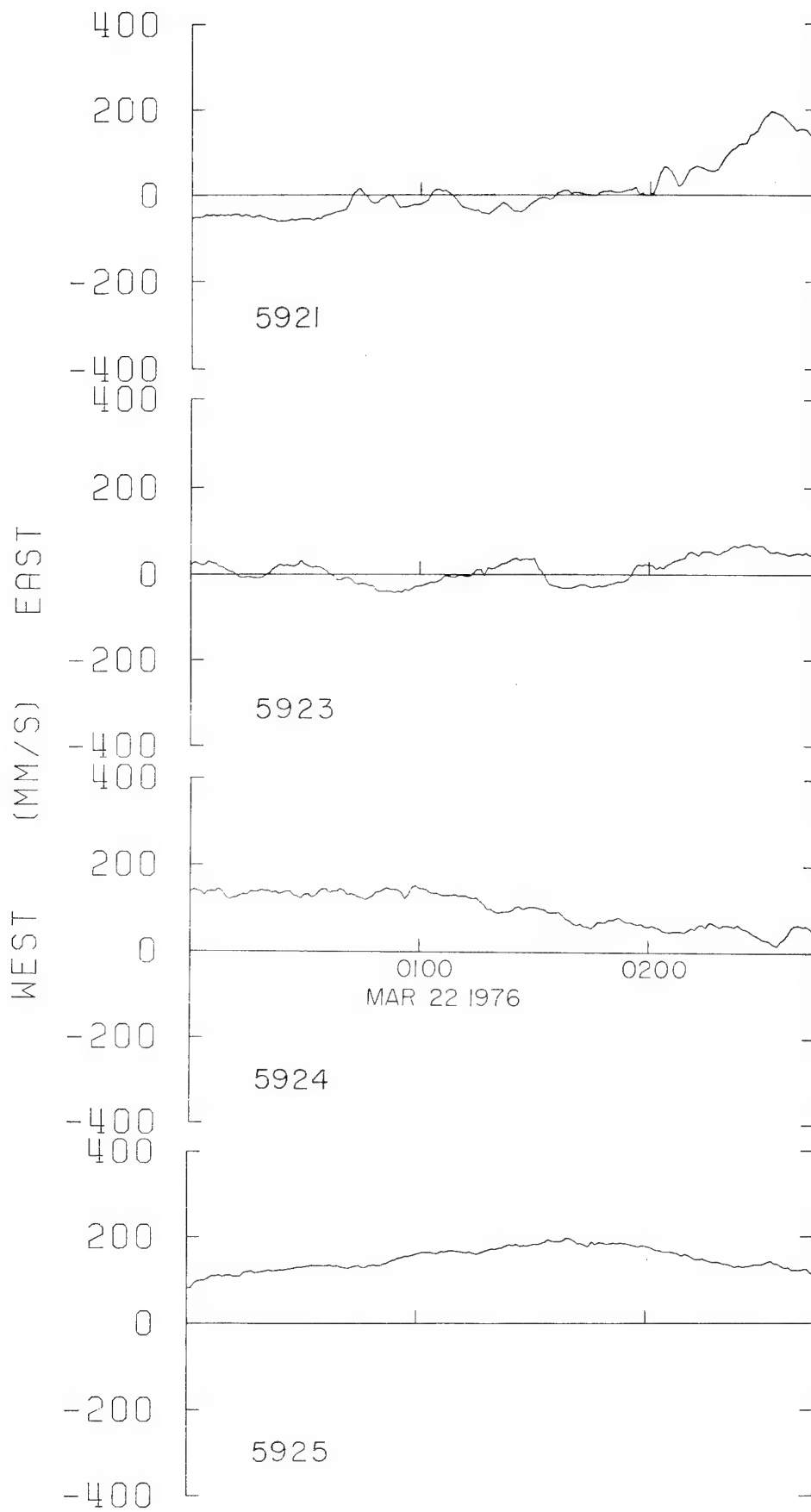


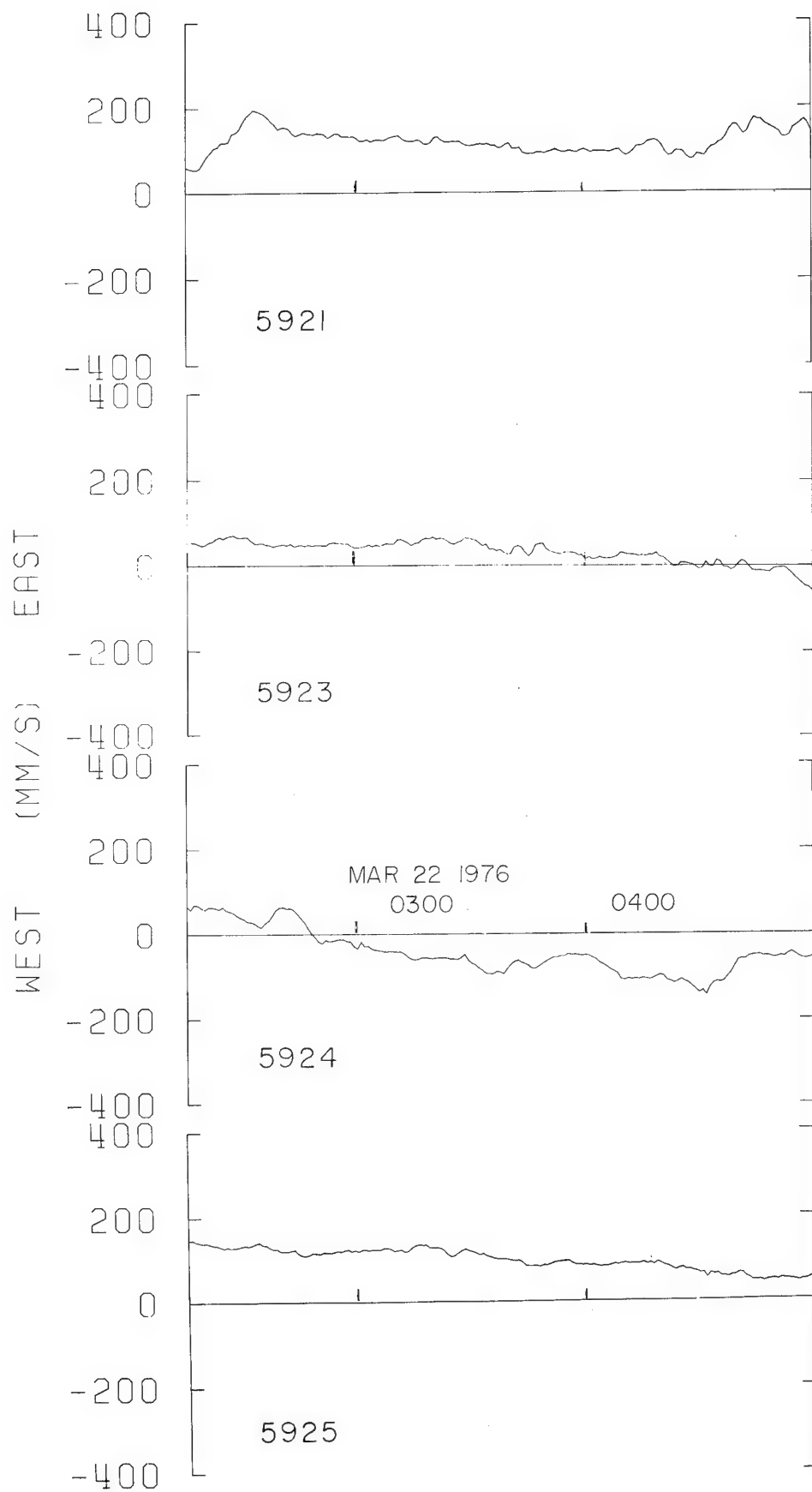


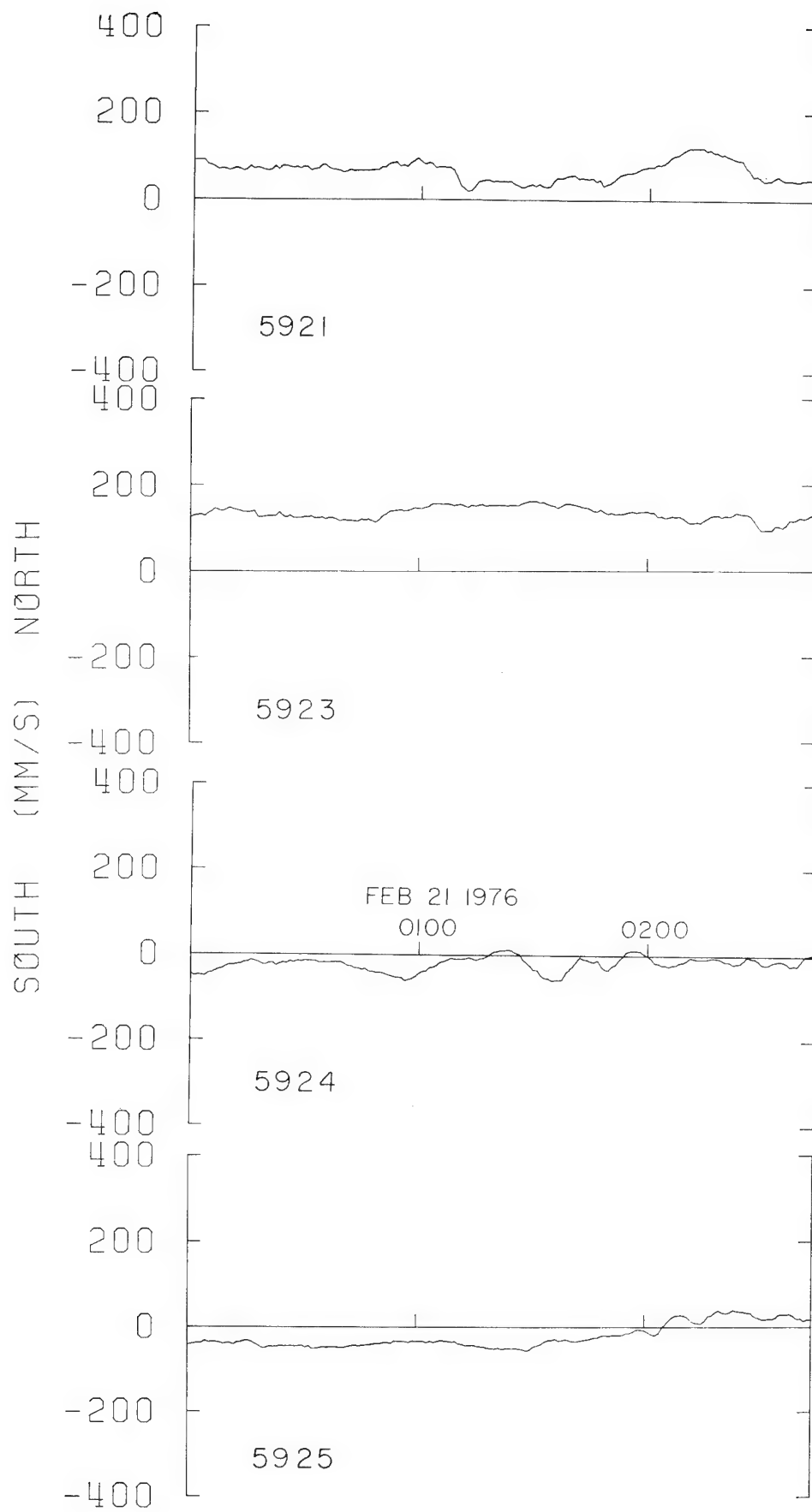


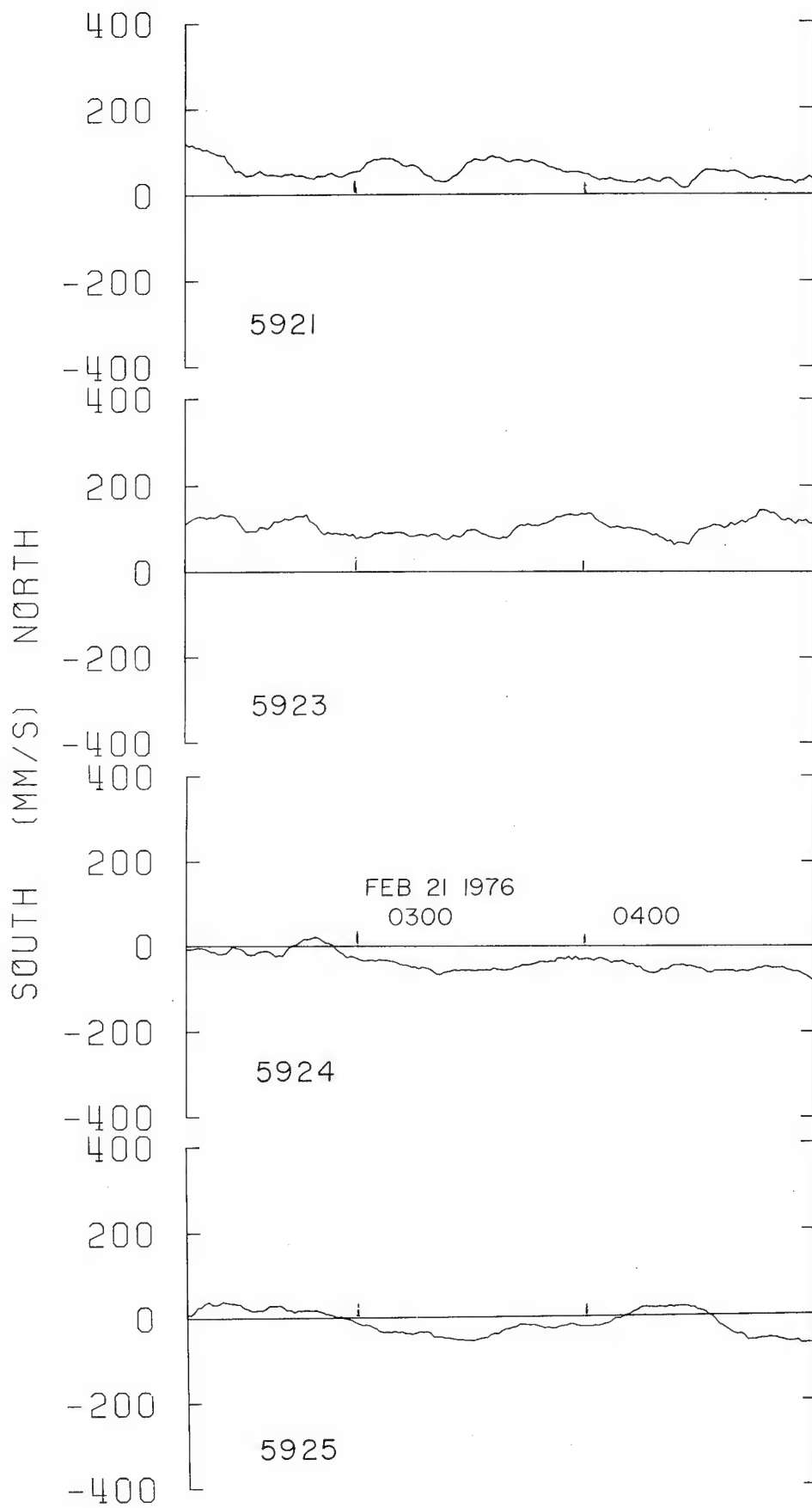


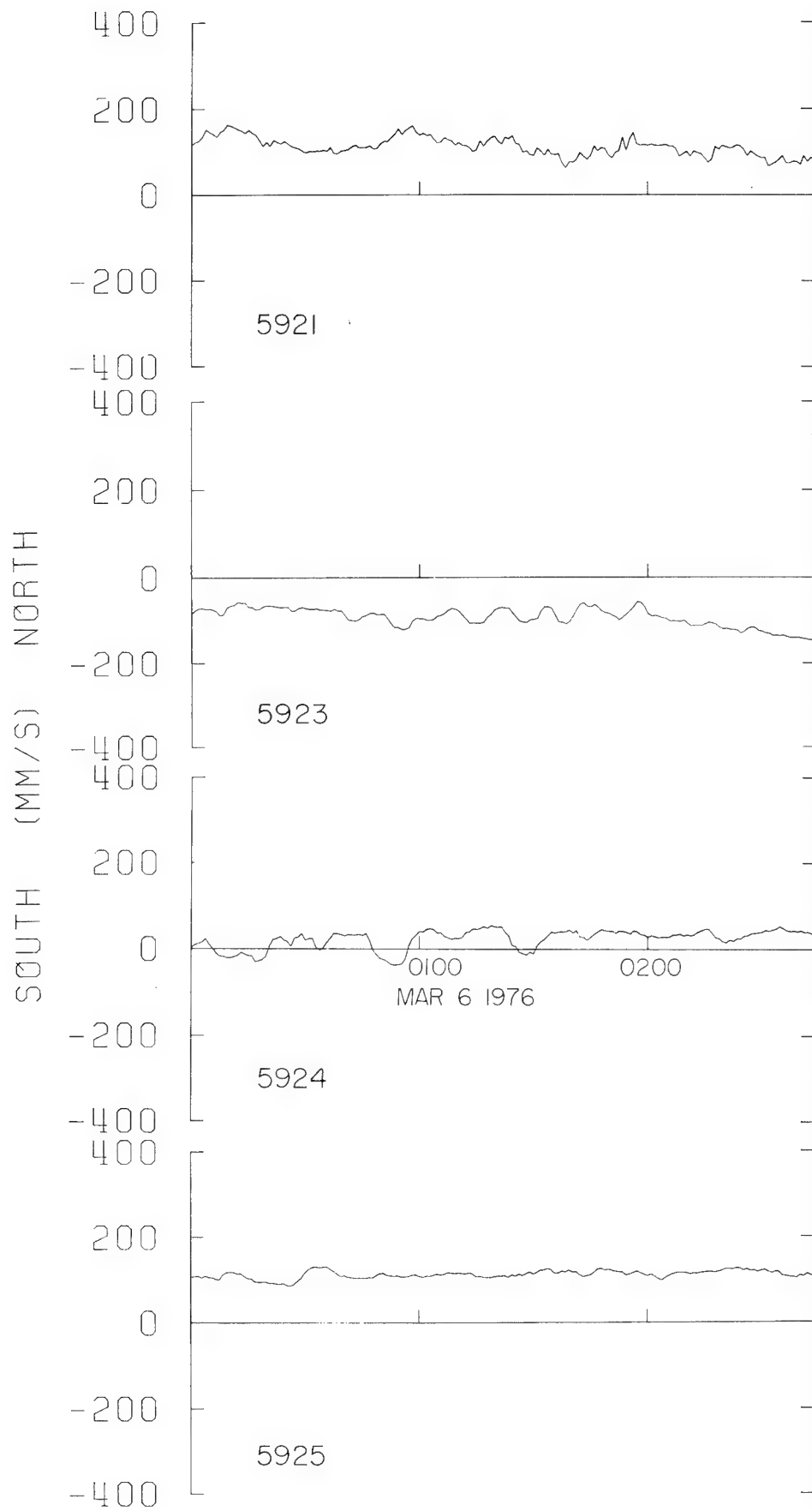


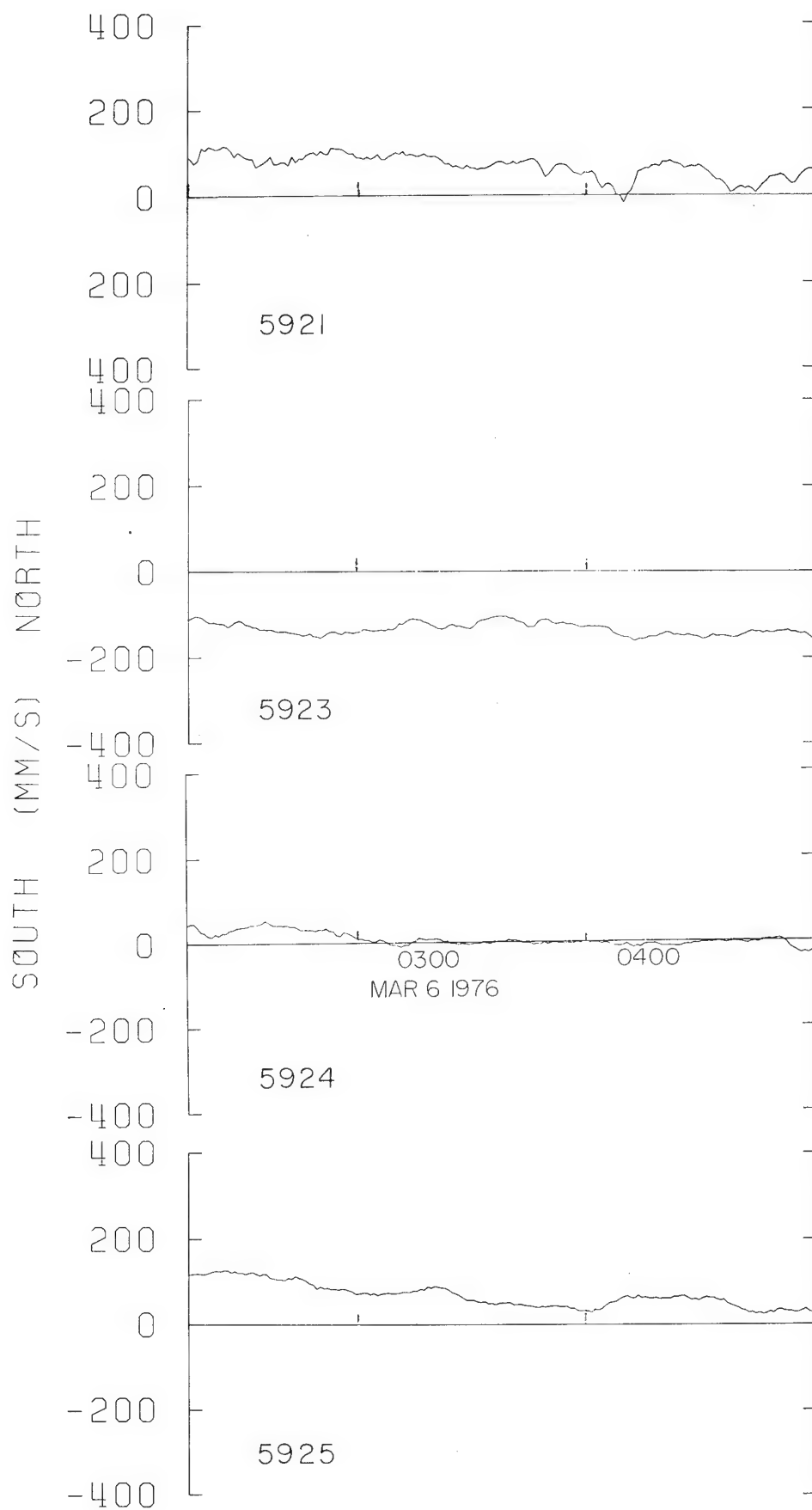


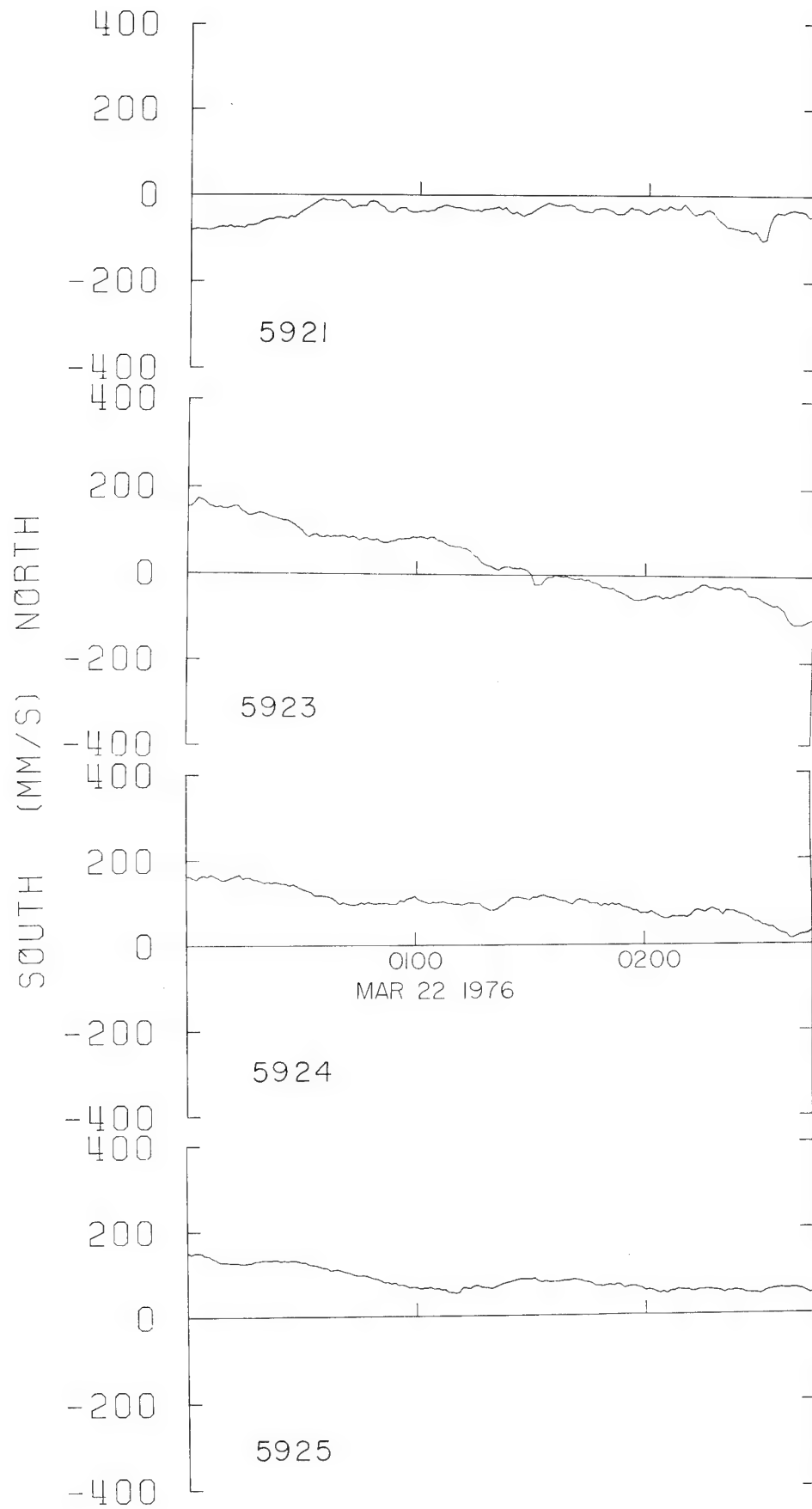


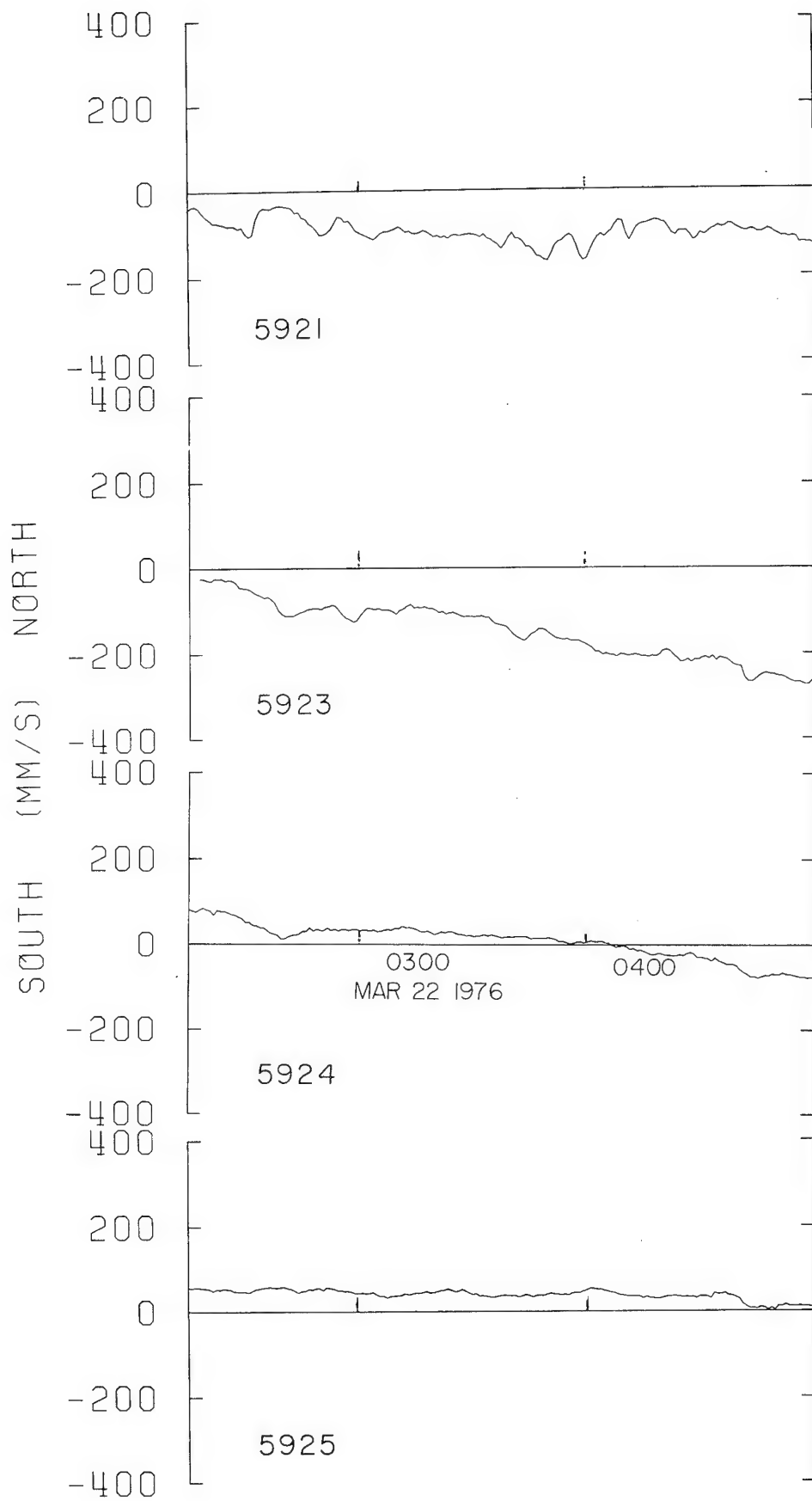


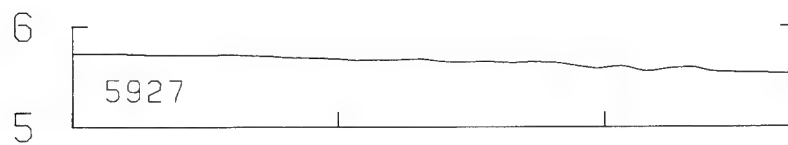
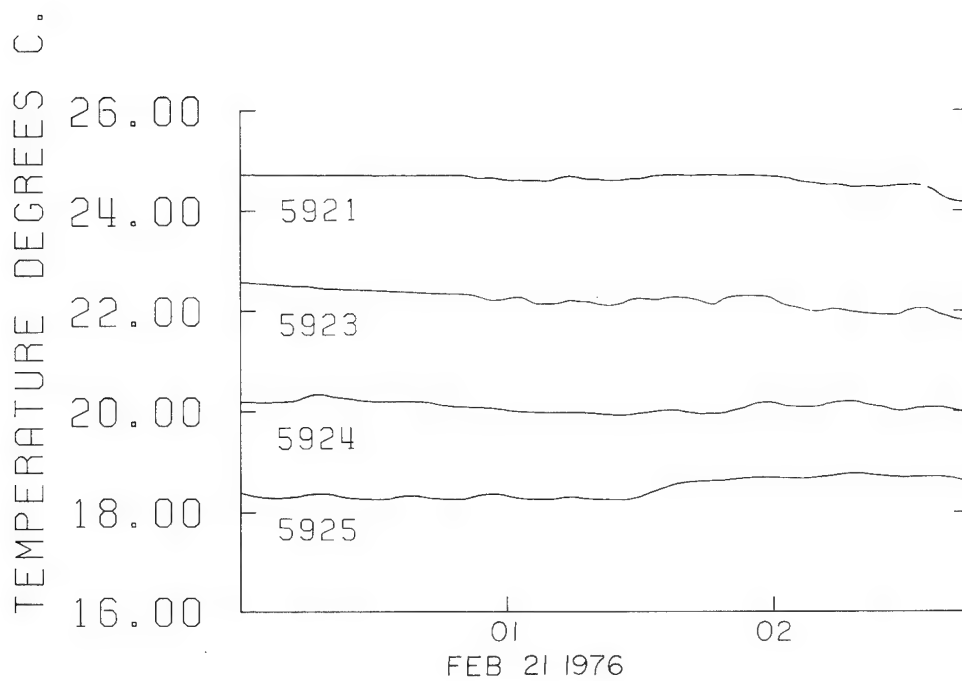




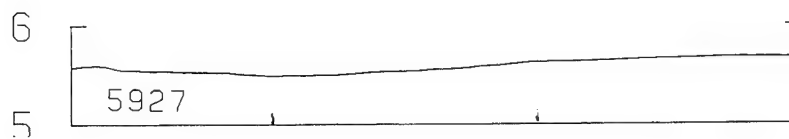
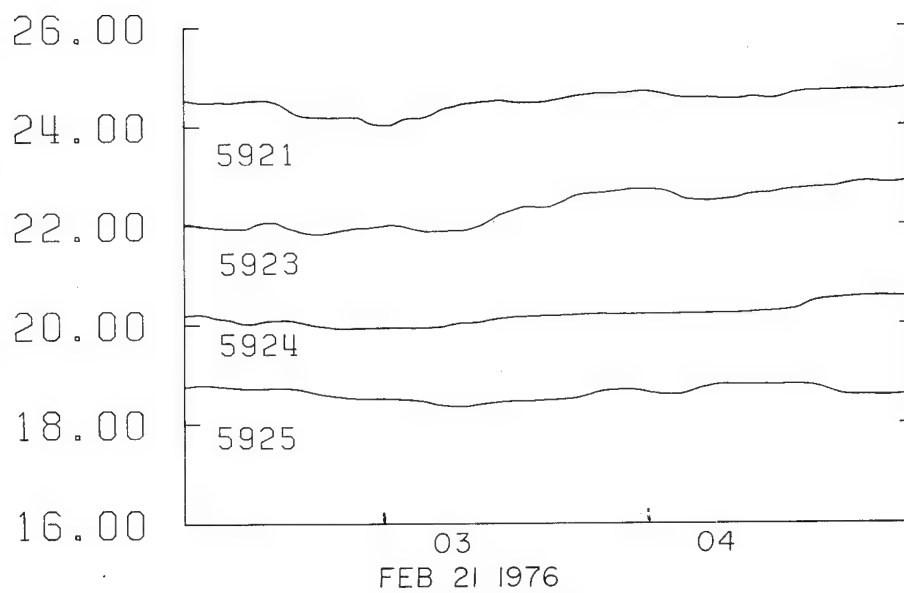


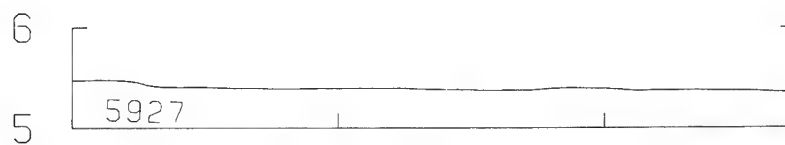
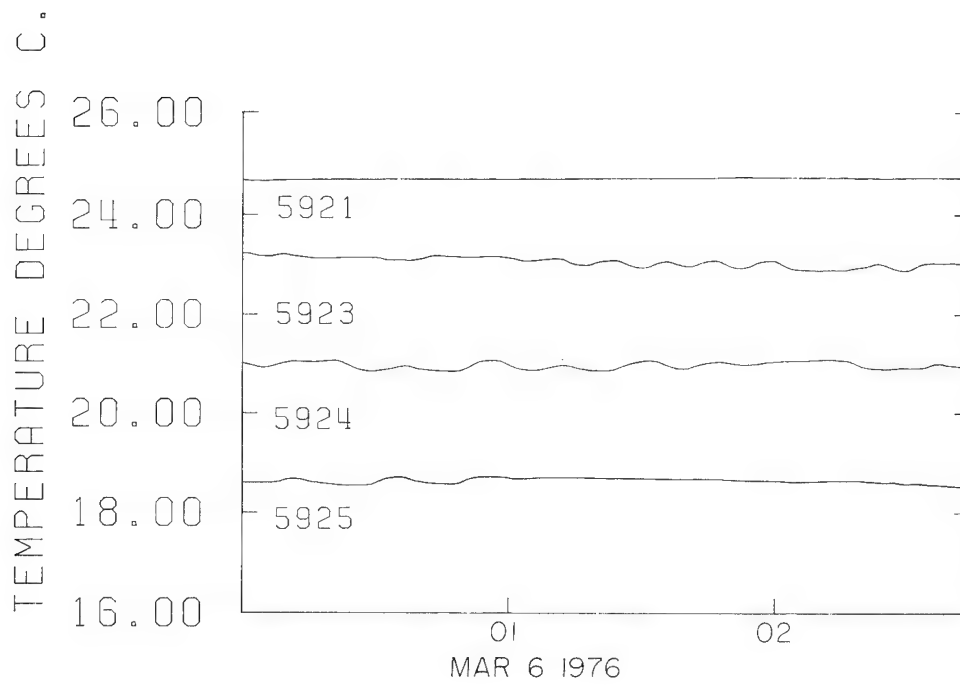


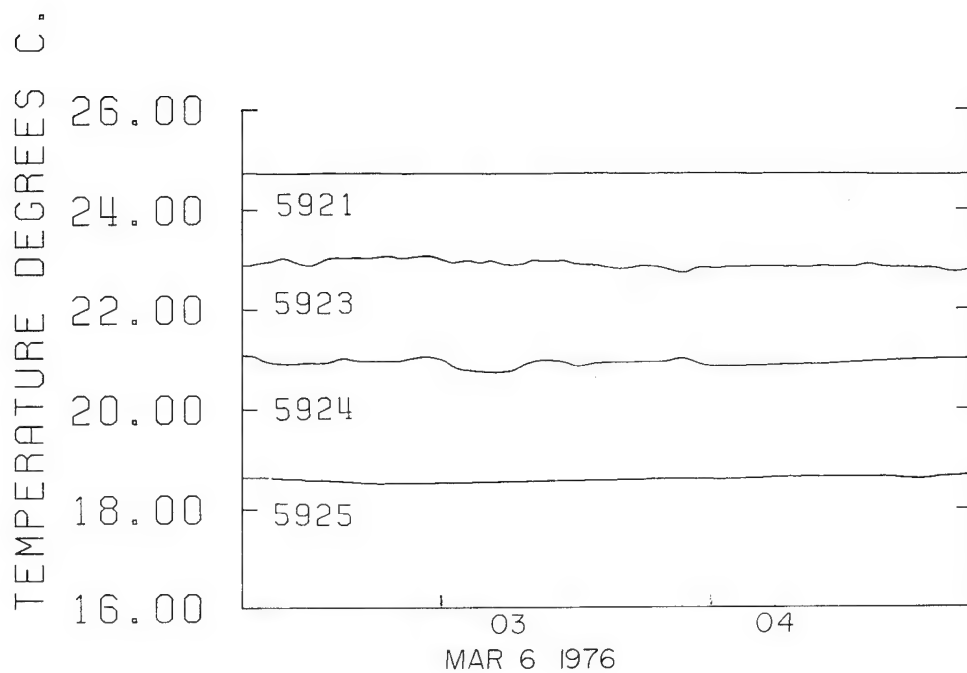


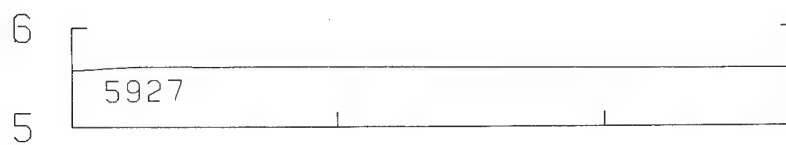
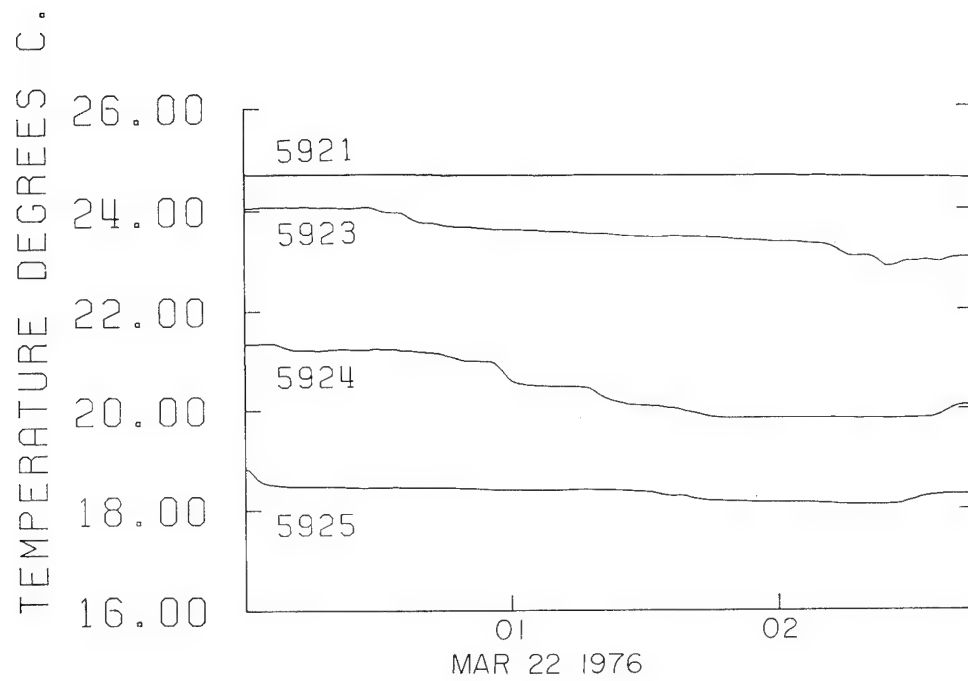


TEMPERATURE DEGREES C.

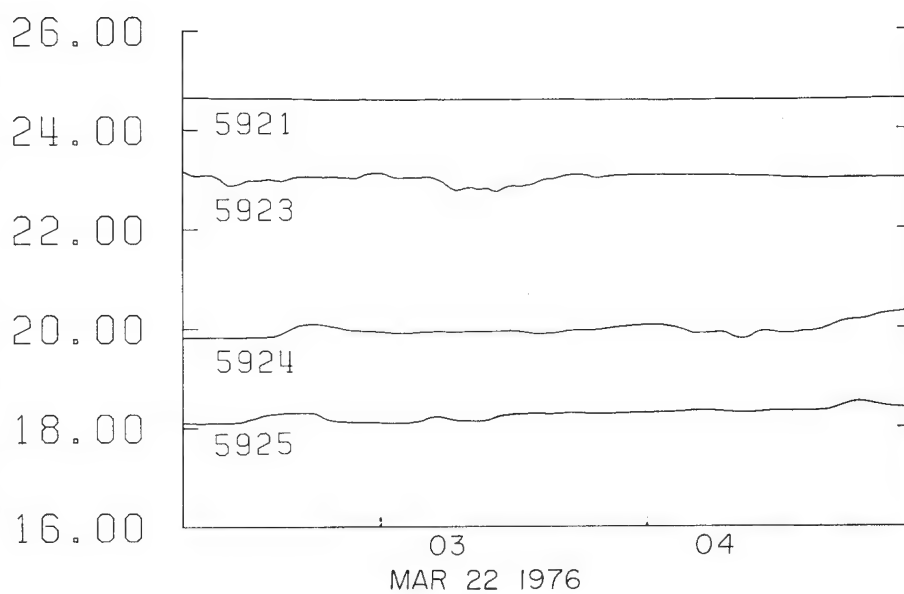








TEMPERATURE DEGREES C.



References

Gonella, J., 1972

A rotary-component method for analysing meteorological and oceanographic vector time series. Deep-Sea Res., 19 (12), 833-846.

Maltais, J. A., 1969

A nine channel digital magnetic tape format for storing oceanographic data. W.H.O.I. Ref. 69-55 (unpublished manuscript).

Moller, D. A., 1976

A computer program for the design and static analysis of single-point subsurface mooring systems: NOYFB. W.H.O.I. Ref. 76-59 (unpublished manuscript).

Singleton, R. C., 1969

An algorithm for computing the mixed radix Fast Fourier Transform. I.E.E.E. Trans. on Audio and Electroacoustics, AU-17 (2), 93-103.

Appendix 1

OPERATIONS PLAN

1. OBJECTIVE

The objective of the experiment is to install a sub-surface mooring near Hydrophone Array 3 which will contain 5 vector averaging current meters at depths below the surface of 100, 150, 200, 250 and 300 meters. An additional meter will be located 22 meters off the bottom. The sampling rates chosen and the experiment duration should provide excellent information on current speed and direction at these six depths in this range location. Diurnal, semi-diurnal and inertial tidal motions will be indicated as well as other major lunar effects. Data from the top five meters is required by APL, while the data from the bottom meter will be of particular interest to the range. An acoustic pinger at the top of the mooring will be tracked during the first 48 hours of the experiment to provide data on mooring motion. It is estimated that the mooring will be installed for 2 months and will be retrieved using the YFU from Roosevelt Roads.

2. PERSONNEL AND FACILITIES

The USNS LYNCH will be used to deploy the mooring. It is anticipated that 6 hours will be required to complete the survey and installation. The installation will probably be 20 February 1976. Woods Hole Oceanographic Institution (W.H.O.I.) personnel will conduct a bathymetric survey and install the mooring. W.H.O.I. personnel are:

Robert G. Walden	- Principal Investigator
Clayton W. Collins, Jr.	- Electronics Engineer
Peter Clay	- Ocean Engineer
Patrick O'Malley	- Technician

Range tracking facilities will be required.

a) LYNCH

The vessel will be loaded by W.H.O.I. personnel prior to the deployment date. LYNCH personnel will be required to operate the crane to hoist aboard a payout winch and other material. A welder will be required to tack-weld the payout winch and cleats to the deck.

In order to set this mooring at an accurate depth, a preliminary bathymetric survey will be required. The precision depth sounder will be checked against well established hydrophone array depths at array locations 1 and 3 prior to the survey.

Appendix 1 (cont.)

Radar and acoustic tracking information will be supplied to the ship every five minutes. This data will also be required at the bathymetry station on the LYNCH. A tracking pinger will be required on the LYNCH for range tracking of the vessel. An additional pinger will be required for attachment to the mooring.

b) AFWTF

Laboratory space at the Range tracking station for the preparation of six current meters and two acoustic releases is requested. Additional space outside is requested for uncrating, measuring wire rope lengths and assembly of mooring components. Space is also requested for storage of packing crates until the experiment's completion. At that time the recovered mooring components will be recreated by W.H.O.I. personnel for return shipment.

The range truck is requested for transportation of the mooring components and handling gear from the air freight warehouse at St. Croix airport, and to deliver this equipment to the U.S.N.S. LYNCH in Frederiksted on or about 19 February 1976. After recovery of the mooring (approximately April 20, 1976) the truck is again requested to transport gear to and from the YFU at the Frederiksted dock.

To recover the mooring in April, a YFU out of Roosevelt Roads will be required. It is requested that a cherry picker crane and Pengo winch be installed for this purpose. We request that W.H.O.I. personnel (names previously given) be picked up at Frederiksted on the date to be established. After recovery of the mooring it is requested that the YFU again dock at Frederiksted at which time W.H.O.I. personnel will put aboard packing crates and other gear left at the tracking station. The equipment should then be transported to Roosevelt Roads where W.H.O.I. personnel will assist in crating and shipping operations for shipment to Woods Hole, Mass.

During the mooring installation phase the range should provide both acoustic and radar tracking. Range coordinate data is requested for each five minutes during the survey phase of the operation. The USNS LYNCH will be equipped with a pinger for tracking purposes. An additional pinger will be attached near the top of the mooring. The mooring installation phase is estimated at 6 hours. Continued tracking of the mooring line pinger is desired for 48 hours.

Appendix 1 (cont.)

3. OPERATION SCENARIO

The ship's track should be monitored by range acoustic and radar tracking. The range will pass to the ship North and East range coordinates every five minutes. Appropriate course corrections should be applied to maintain track. Bathymetry data will be made continuously during the operation with five minute position times noted on the record.

- a) Depart Frederiksted
- b) Proceed to Array 1 and stop

Coordinates N 53386
E 29079

Check depth

Depth to bottom should be:

$2350 + 30 = 2380 \text{ ft.}$
= 397 fath.
= 726 meters

Note depth sounder discrepancy

- c) Proceed to Array 3 and stop

Coordinates N 46668
E 32440

Check depth

Depth to bottom should be:

$3003 + 3 = 3033 \text{ ft.}$
= 505 fath.
= 925 meters

Note depth sounder discrepancy

- d) Determine depth sounder correction
- e) Proceed on course to make good 307°T approximately 3600 ft. to Point Alpha

Coordinates N 34600
E 43750

- f) Turn to course to make good 078°T approximately 6350 ft. to Point Baker

Coordinates N 35900
E 50000

- g) Turn to heading to make good 245°T approximately 12000 ft. at a speed of 2 knots to Point Charlie

Coordinates N 30900
E 39300

Appendix 1 (cont.)

- h) Continue on course at best reasonable speed approximately 15000 ft. to Point Delta

Coordinates N 24750
E 25850

- i) The vessel should then heave-to while the acoustic releases are lowered and tested. The vessel can then take up a course to make good a reciprocal along the same track. (065°T) Establish speed of two knots.

- j) During this transit the mooring will be paid out on the surface behind the vessel. The anchor will be held aboard until the drop site at Point Easy.

Coordinates N 34000
E 45800

- k) After anchor launch, the mooring will be in place in approximately 8 minutes. It is estimated that the final mooring position, Point Foxtrot, will be at

Coordinates N 33650
E 45000

- l) The range should obtain X, Y, and Z coordinate data on the mooring line pinger each minute after anchor launch for approximately 15 minutes. X, Y, and Z coordinates of this pinger are desired by the ship at the end of this fifteen minute "settle-out" period.

- m) The vessel should heave-to after anchor launch in order to track the release transponder until the anchor bottoms. Coordinate data of the vessel each minute is also requested for this 15 minute period.

- n) The vessel will then proceed to pass over the mooring to obtain an independent depth by the fathometer of the top radio float.

- o) Secure operations.

<p>Woods Hole Oceanographic Institution WHOI-77-41</p> <p>A COMPILATION OF MOORED CURRENT METER DATA AND ASSOCIATED MOORING ACTION DATA FROM MOORING 592, VOLUME XIV, (1976 DATA) by S. Tarbell, R. Payne and R. Walden. 122 pages. September 1977. Prepared for the Applied Physics Laboratory of the Johns Hopkins University under Contract 600651.</p> <p>Summaries of moored current meter data from one mooring set and retrieved in 1976 near St. Croix by the Woods Hole Oceanographic Institution are presented. The averaged current data are presented as statistics, spectral diagrams, plots of vector and scalar quantities versus time. Horizontal and vertical mooring motion data are also presented.</p>	<p>1. Mooring Motion</p> <p>2. Current Data</p> <p>3. St. Croix Mooring</p> <p>I. Tarbell, S.</p> <p>II. Payne, R.</p> <p>III. Walden, R.</p> <p>IV. 600651</p> <p>This card is UNCLASSIFIED</p>	<p>Woods Hole Oceanographic Institution WHOI-77-41</p> <p>A COMPILATION OF MOORED CURRENT METER DATA AND ASSOCIATED MOORING ACTION DATA FROM MOORING 592, VOLUME XIV, (1976 DATA) by S. Tarbell, R. Payne and R. Walden. 122 pages. September 1977. Prepared for the Applied Physics Laboratory of the Johns Hopkins University under Contract 600651.</p> <p>Summaries of moored current meter data from one mooring set and retrieved in 1976 near St. Croix by the Woods Hole Oceanographic Institution are presented. The averaged current data are presented as statistics, spectral diagrams, plots of vector and scalar quantities versus time. Horizontal and vertical mooring motion data are also presented.</p>	<p>1. Mooring Motion</p> <p>2. Current Data</p> <p>3. St. Croix Mooring</p> <p>I. Tarbell, S.</p> <p>II. Payne, R.</p> <p>III. Walden, R.</p> <p>IV. 600651</p> <p>This card is UNCLASSIFIED</p>	<p>Woods Hole Oceanographic Institution WHOI-77-41</p> <p>A COMPILATION OF MOORED CURRENT METER DATA AND ASSOCIATED MOORING ACTION DATA FROM MOORING 592, VOLUME XIV, (1976 DATA) by S. Tarbell, R. Payne and R. Walden. 122 pages. September 1977. Prepared for the Applied Physics Laboratory of the Johns Hopkins University under Contract 600651.</p> <p>Summaries of moored current meter data from one mooring set and retrieved in 1976 near St. Croix by the Woods Hole Oceanographic Institution are presented. The averaged current data are presented as statistics, spectral diagrams, plots of vector and scalar quantities versus time. Horizontal and vertical mooring motion data are also presented.</p>	<p>1. Mooring Motion</p> <p>2. Current Data</p> <p>3. St. Croix Mooring</p> <p>I. Tarbell, S.</p> <p>II. Payne, R.</p> <p>III. Walden, R.</p> <p>IV. 600651</p> <p>This card is UNCLASSIFIED</p>
<p>Woods Hole Oceanographic Institution WHOI-77-41</p> <p>A COMPILATION OF MOORED CURRENT METER DATA AND ASSOCIATED MOORING ACTION DATA FROM MOORING 592, VOLUME XIV, (1976 DATA) by S. Tarbell, R. Payne and R. Walden. 122 pages. September 1977. Prepared for the Applied Physics Laboratory of the Johns Hopkins University under Contract 600651.</p> <p>Summaries of moored current meter data from one mooring set and retrieved in 1976 near St. Croix by the Woods Hole Oceanographic Institution are presented. The averaged current data are presented as statistics, spectral diagrams, plots of vector and scalar quantities versus time. Horizontal and vertical mooring motion data are also presented.</p>	<p>1. Mooring Motion</p> <p>2. Current Data</p> <p>3. St. Croix Mooring</p> <p>I. Tarbell, S.</p> <p>II. Payne, R.</p> <p>III. Walden, R.</p> <p>IV. 600651</p> <p>This card is UNCLASSIFIED</p>	<p>Woods Hole Oceanographic Institution WHOI-77-41</p> <p>A COMPILATION OF MOORED CURRENT METER DATA AND ASSOCIATED MOORING ACTION DATA FROM MOORING 592, VOLUME XIV, (1976 DATA) by S. Tarbell, R. Payne and R. Walden. 122 pages. September 1977. Prepared for the Applied Physics Laboratory of the Johns Hopkins University under Contract 600651.</p> <p>Summaries of moored current meter data from one mooring set and retrieved in 1976 near St. Croix by the Woods Hole Oceanographic Institution are presented. The averaged current data are presented as statistics, spectral diagrams, plots of vector and scalar quantities versus time. Horizontal and vertical mooring motion data are also presented.</p>	<p>1. Mooring Motion</p> <p>2. Current Data</p> <p>3. St. Croix Mooring</p> <p>I. Tarbell, S.</p> <p>II. Payne, R.</p> <p>III. Walden, R.</p> <p>IV. 600651</p> <p>This card is UNCLASSIFIED</p>	<p>Woods Hole Oceanographic Institution WHOI-77-41</p> <p>A COMPILATION OF MOORED CURRENT METER DATA AND ASSOCIATED MOORING ACTION DATA FROM MOORING 592, VOLUME XIV, (1976 DATA) by S. Tarbell, R. Payne and R. Walden. 122 pages. September 1977. Prepared for the Applied Physics Laboratory of the Johns Hopkins University under Contract 600651.</p> <p>Summaries of moored current meter data from one mooring set and retrieved in 1976 near St. Croix by the Woods Hole Oceanographic Institution are presented. The averaged current data are presented as statistics, spectral diagrams, plots of vector and scalar quantities versus time. Horizontal and vertical mooring motion data are also presented.</p>	<p>1. Mooring Motion</p> <p>2. Current Data</p> <p>3. St. Croix Mooring</p> <p>I. Tarbell, S.</p> <p>II. Payne, R.</p> <p>III. Walden, R.</p> <p>IV. 600651</p> <p>This card is UNCLASSIFIED</p>